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unded by **FLORENT CUNIER** and continued by **WARLOMONT**

EDITED, PARIS,

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ANNALES D'OCULISTIQUE

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I.—ORIGINAL CONTRIBUTIONS

MEMOIRS

AMAUROSIS AND AMBLYOPIA AFTER HÆMATEMESIS

By Dr. **ED. PERGENS** (Brussels).

(Translated by Dr. Charles W. Stevens.)

Amaurosis occurring after hæmatemesis is a sequel which has been known for centuries. In spite of this fact the number of cases observed seems to be very small, for I have been able to find only about sixty published cases. It is mentioned in the Hippocratic works in the book *Περὶνούσων*, Book 2. Then there is a long silence until the end of the seventeenth century, when Riedlin published a case with re-establishment of vision. In the eighteenth century Trew communicated another case. Other blood losses were already known to be causes of amaurosis, especially uterine losses and the copious blood-lettings which were then so much in fashion. Taylor (1), in the first iconographic atlas of the diseases of the eye, was familiar with the pupilary dilatation after amaurosis from loss of blood; he knew it as occurring in both eyes or in only one eye. He does not mention what form of blood loss gave rise to this phenomenon, but states that the cases did not recover. Rowley (2) was also familiar with amaurosis from hæmatemesis and from too abundant blood-letting. Plenck (1) places these affections on the same footing as those produced by ptyalism and frequent diarrhœa and calls them "amaurosis exhaustorum."

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(1) *Nova Nosographia Ophthalmica*, 1766, p. 53, cap. XXIV, §§ 194–195.

(2) *Treatise on the principal diseases of the eye*, 1773.

A very interesting work is that of Trnka de Krzowitz (2) who gives a summary of a large number of cases of amaurosis from different causes; amaurosis from hæmatemesis is there classed with those caused by hemorrhages, sanguinary emissions, ordinary vomiting, diarrhœa, cholera, prolonged lactation, and other debilitating causes.

These are the only cases that I have been able to collect from the literature earlier than the nineteenth century. On the other hand, the literature in relation to amaurosis consecutive to other forms of blood loss is more fully represented. Several efforts had already been made to explain the mechanism of their production. The first person who attempted to explain this subject did so very briefly, stating that as the result of the loss of fluid the optic nerve became too dry to properly perform its function. This explanation was given by Oehme (3). Boerhaave (4), in speaking of amaurosis from blood-letting, says that the brain receives less blood, and hence becomes unfit for the passage of the "animal spirit." Trnka (5) agrees with this opinion, but only when there had been collapse. He does not accept Oehme's theory of the dryness of the optic nerve because he finds that this theory will not explain the sudden cases and those of short duration. He believes that the amaurosis produced by vomiting arises from an infarct of the vessels of the head causing compression on the optic nerve or the retina (6).

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(1) *Doctrina de morbis oculorum*, 1777, p. 180.

(2) *Historia amauroseos*, 1781.

(3) OEHME. *Diss. de amaurosi*, 1748.

(4) BOERHAAVE. *De morbis oculor*, 1748, p., 103 of the Venetian edition: "......quando cortex cerebri......ineptus redditur ad sanguinem transmittendum, pro materia spirituum animalium......"

(5) *Loc. cit.*

(6) *Loc. cit.*, p. 224: "Ex omnibus......satispatet, amaurosim a vom itu ortam infarctui vasorum capitis deberis."

Lefébure (1) believes that amaurosis after hæmatemesis arises from collapse of the brain; he is optimistic and gives a generally favorable prognosis. Twenty years later Travers (2) differentiated this form from amaurosis by congestion, as the treatment (blood-letting) indicated for the latter form would be fatal in the former. Several authors (Beer, Hall, Tyrrel and Deval) have accepted the "amaurosis exhaustorum" theory, while Lawrence (3) rejects this heterogeneous etiology which Arlt and Stellwag have still retained.

Sichel (4) regards it as primitively an asthenic cerebral amaurosis, the localisation of which would be in the cerebral origins of the optic nerve.

In 1860, von Græfe (5) stated that the cause of amaurosis after hæmatemesis was altogether unknown to him, but he excludes the possibility of an apoplexy at the base of the brain, because in that case, there would be paralysis of the oculomotor nerve ; if it were situated in the thalamus the amaurosis would become manifest in both eyes. It could not come from the effort made during the vomitings for, he says, these were very easy in his case, and the amaurosis came later. He leans more or less towards a hemorrhage in the sheath of the chiasm and does not accept the theory of anæmia of the optic nerve as cause of these disturbances. In 1866 von Græfe acknowledged an irritant retrobulbar process.

In 1872, Samelsohn (6) brought forward a new hypothesis, basing his theory on the investigations of Schwalbe in regard to the lymphatic canals of the eye and the optic nerve. He believes that a central affection is quite impossible since, in that case, several nerve centres would be affected. The loss of blood, in his opinion, produces a vacuum in the cranial cavity ; the lymph fills this vacuum, and when the blood supply is restored the lymph is driven into the intervaginal space of the optic nerve. The later is infiltrated with serum, paralysed by pressure and atrophied by inter-fibrillar proliferation. Samelsohn admits that in cases where the blood loss is very small his hypothesis is not a sufficient explanation. For the latter cases he concludes later (1873) (1) that there is a hemorrhage into the intervaginal space of the optic nerve.

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(1) *Amaurosis* (German translation), 1801, p. 10.

(2) *Synopsis of the diseases of the eye*, 1820.

(3) *On the nature, symptoms, and treatment of the different species of amaurosis*, 1821.

(4) *Iconor. ophth.*, 1852-59, p. 759.

(5) *Græfe's Arch.*, Vol. VII., 2, p. 143.

(6) *Græfe's Arch.*, Vol. XVIII., 2, p. 233.

In a third publication (1875) (2) the author accepts both a central and peripheral cause in a case with slight loss of blood and concludes in general that in such cases a central localisation would be the common cause of the hemorrhage and of the amaurosis. This would be an affection of the class which Lussana saw and which commenced after an injury of the optic thalamus; that is to say, a softening of the stomach and of the colon with hyperæmia of the liver. Brown-Sequard observed small hemorrhages in the abdominal and thoracic organs after injury of different parts of the brain. Hirschberg was the first to make an autopsy on a case of amaurosis from hæmatemesis three years after its commencement. The details are mentioned in case No. 49 of this article. There was no clot in the sheath of the optic nerve, which was atrophied ; he concludes that there was an ascending atrophic process. Ziegler, case No. 60 of this article, made an autopsy twenty-three days after the commencement of the amaurosis ; he found a fatty degeneration which started at the lamina cribosa. Ziegler concludes that there was a degenerative ischæmia. The fact that amaurosis was not revealed at the commencement is explained by the fact that the small amount of blood remaining may suffice for sometime, but is insufficient long to prevent necrosis. Spasmodic contraction of the arteries is adduced by Ziegler to explain the localisation of the degenerative process in the optic nerve.

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(1) *Tagebl. d. Wiesbad. Naturf. Vers.*, p. 160.

(2) *Græfe's Arch.*, Vol. XXI., 1. p. 150.

Raehlmann (1) made an autopsy on a similar case arising from a uterine hemorrhage. All the arteries presented restricted lumens from a fibrous endarteritis. There were in the lamina elastica lamellæ of newly formed fibrous tissues with a large number of cells similar to endothelial cells. The veins had also undergone slight constriction. In two places there was almost total obliteration. In the intercapillary portions the arteries were not concentrically constricted, but only in places. In addition to this, there was œdema of the retina especially about the disc and principally in the external layers; in this space the veins were generally somewhat contracted. In the choroid the endarteritis was still more pronounced, and there was hyaline degeneration; the arteries were contracted, and the veins dilated.

The *visual field* is generally reduced, but not in the characteristic manner. In addition to concentric narrowing, there are cases of hemianopsia of irregular form and cases in which the visual field is only a slit. In my case, No. 64, large objects were perceived only in the peripheral portions of the field.

The *luminous sense* has been but rarely mentioned, but in the cases mentioned it has been much diminished. In my case, No. 64, it was for the right eye $\frac{1}{15}$, and for the left $\frac{1}{10}$, Treitel (2), by the daylight in my office. In the sunlight or strong illumination the patient saw with difficulty.

The *color sense* has also been rarely mentioned, and it is, therefore, probable that nothing special has been observed. In Stan's case, No. 43, color perception was normal, but ultimately there was dyschromatopsia. Case No. 64 should have perceived colors, since the visual field of the left eye extended to

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(1) *Fortschr. d. Mediz.*, 1889, p. 928.

(2) Treitel's tables are made of squares of 1 centimetre, painted on a black ground in tones obtained by a mixture of white and black on Maxwell's discs. He takes as a unit 3° white + 357° black, 1 square centimetre of which is seen distinctly on a black ground by the normal eye at a distance of 1 metre. In Case No. 64 the eye could distinguish a disc composed of 45° white + 315° black, the left eye 30° white + 330° black.

32° in the upper part. He did not, however, but in Wolfberg's tables (10 x 10 centimetres) he indicated yellow as the most brilliant, then green, then red, and finally, blue. Persons, with opacities of the lens or the vitreous, generally see red as more brilliant than green.

The *ophthalmoscopic image*, in cases of considerable duration, generally reveals an atrophy of the disc, frequently white, and rarely brown, blue, or green. The arteries are much contracted, and the veins less so. If the inflammation or œdema of the optic nerve have lasted for a long time, the vessels show white spots.

The commencement seems to be characterized by an ischæmia of the retina. Soon there is œdema, which extends from the nerve towards the periphery, frequently in an irregular manner and generally only in the neighboring parts. After that, there is venous hyperæmia manifesting itself by the thickening and sinuosity of a vessel; the arteries may be hyperæmic, or they may be thinned at the first inspection. At the same time, or shortly afterward, there may be hemorrhages, œdematous spots, or white spots resembling hoar-frost. Several inflammatory attacks may occur in the course of the disease without there being a new attack of hæmatemesis, or of melæna. After a variable time, all is resolved into the phenomena of atrophy, etc., mentioned above. The attack and the atrophy may be partial, and a corresponding ophthalmoscopic image would then be obtained.

In my summary no ophthalmoscopic changes were observed in Cases Nos. 11 and 20, and almost none in No. 48. In No. 61 there was an œdema extending beyond the macula and causing the latter to appear as a red spot.

The *prognosis* is quite unfavorable, there being a mortality of 3%, permanent amaurosis 44%, bad or moderate vision 24%, fair vision 19%, and complete recovery only 8%.

Therapeutics seemed to have no great influence. Iron tonics, especially strychnine, etc., have been tried, not to speak of paracentesis, iridectomy and blood-letting, and all with mediocre success.

Until the etiology is better understood the treatment must be symptomatic.

Dilatation of the pupil seems to be the rule, with reaction completely lacking, or almost so. There are, however, rare exceptions when it reacts perfectly. In cases where a single eye is amaurotic, synergic movements with the other eye exist; when the seeing eye is closed the pupil of the other eye dilates and remains in this condition until light falls on the seeing eye.

A relation between the amount of blood lost and the severity of the amaurosis does not seem to exist. Furthermore, it is difficult to estimate on account of the melæna; also because estimations by the laity are unreliable. I have seen a quantity of blood amounting to 200 to 300 c. c. on white marble which was estimated as a bucketful.

Statistics.

Of the cases given below, No. 1 may be eliminated; No. 31 does double service; Nos. 44 and 54, in which no disturbance of vision was found, but much disturbance of the visual apparatus. Then there are annotations like those of Mooren (Nos. 15 to 18 and 30), those of Manz (27 and 28), and of Horstmann (29), which were communicated in the course of a discussion.

There remain, then, 51 persons affected with amblyopia or amaurosis after hæmatemesis, whose sex is indicated, that is 36 men and 15 women, deducting cases Nos. 44 and 54. It is impossible to state whether this relation is proportional to the greater or less frequency of ulcer of the stomach in man and woman. Brinton gives the relation of men to women as 2 : 1; With gives the proportion as 7.3 : 1, while Starke finds that ulcer is more frequent in men. It would be rash to form a conclusion from the number of persons suffering from ulcer of the stomach as to the number of those affected with visual disturbances. Grunfelde made 450 autopsies at Copenhagen and found a round ulcer in 92 cases (20%), and yet in a city where this disease is so prevalent no case of amaurosis after hæmatemesis has come to my knowledge.

The age of 43 persons is mentioned:

5 years	1 person	1 girl	
20 to 25 years	2 persons	1 woman	1 man
26 to 30 —	2 —		2 men
31 to 35 —	2 —		2 —
36 to 40 —	5 —	2 women	3 —
41 to 45 —	7 —	2 —	5 —
46 to 50 —	8 —	2 —	6 —
51 to 55 —	6 —	1 woman	5 —
56 to 60 —	3 —	1 —	2 —
61 to 65 —	3 —		3 —
66 to 70 —	1 person		1 man
71 to 75 —	2 persons	1 —	1 —

Of these 43 cases, 12 were under and 31 over forty years of age.

Whether one or both eyes were affected is mentioned of 57 persons : 49 were affected in both eyes, and 8 in one eye only. Of the latter the right eye was affected four times (only men), and the left eye three times (all women), and one case, probably the right eye, in which the sex is not given. Both eyes were affected in 31 men and 12 women, and 6 persons whose sex is not mentioned.

Age seems to have no influence as to monolateral or bilateral attacks. The eyes may be affected successively.

The *lapse of time between the last hæmatemesis and the commencement of the visual disturbances* is mentioned in 43 persons: In 9 persons, 5 of whom were men, the visual disturbance appeared immediately; in 4 (1 man and 3 women) within forty-eight hours; in 8 (5 men and 3 women) the second or third day; in 14 (12 men and 2 women) from the fourteenth to the eighteenth day; in 6 (4 men and 2 women) in the course of the second week, and in two women in the course of the third week.

It will be seen that 35 persons were affected within the first week. The time of the commencement does not seem to have any influence on the prognosis. The permanent cases and those cured are so distributed as to admit of no generalisation.

The *final result* is known in 50 persons: 3 deaths (1 man and 2 women), and 18 totally blind (10 men, 3 women, and 5 persons whose sex is not given); 9 persons were totally blind in one eye (4 men and 5 woman); two men in the right eye, 2 men in the left eye, 4 women in the left eye and 1 in the right. In these cases the other eye was normal (the right eye of one woman), in fairly good condition (the left eye of one woman, id. of one man, and the right eye of one man), or highly amblyopic (1 man in the right eye, another in the left and 2 women in the left).

Nine persons were highly amblyopic in both eyes (7 men, 1 woman, and 1 person of unknown sex); 2 men and 1 person (sex unknown), who were only affected in the right eye, and were amblyopic in that eye.

Seven persons (6 men and 1 woman) with both eyes affected were much improved in both eyes, and also 1 man whose right eye was alone affected.

Total recovery was noticed only in 2 men and 1 woman, both eyes of whom were affected, and in 1 man whose right eye alone was affected.

In brief, 96 eyes were affected, 45 of which remained blind, 8 recovered completely, 18 were much improved, and 25 obtained moderate or poor vision.

Description of two new cases.—63. A woman sixty years old, completely amaurotic, was brought to me for consultation. She had lost her sight, as the result of repeated hæmatemesis, at the age of fifty-seven. She did not know exactly when her vision had been affected, and her replies as to the commencement of the amaurosis were quite indefinite.

On ophthalmoscopic examination there was found in the left eye white atrophy of the disc and contracted veins and arteries without other special signs. The right eye, for which she came for consultation, was affected with keratitis with hypopyon, and was softened;

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46 to 50 —	8 —	2 —	6 —
51 to 55 —	6 —	1 woman	5 —
56 to 60 —	3 —	1 —	2 —
61 to 65 —	3 —		3 —
66 to 70 —	1 person		1 man
71 to 75 —	2 persons	1 —	1 —

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On ophthalmoscopic examination there was found in the left eye white atrophy of the disc and contracted veins and arteries without other special signs. The right eye, for which she came for consultation, was affected with keratitis with hypopyon, and was softened;

there had been severe pain in the eye, as well as in the peri-orbital region, but she refused enucleation. The pupil of the left eye was much dilated and did not react. Tension was normal. There was no luminous perception. Formerly an oculist had told her that both eyes were affected in the same manner.

64. This was a man thirty-six years old. There was no previous history of hæmatemesis, and he had had no other disease than scarlet fever in childhood. He was an alcoholic. On the 9th of March, 1895, he was seized with bloody vomiting, which was repeated twice on that day. The family estimated the quantity of blood at ½ litre. Since then the vomiting has ceased completely, but the patient had black stools on the 10th and 11th of March. Analysis of the urine showed neither albumen nor sugar. On March 16, about six in the evening, the patient perceived a cloud before the eyes, which seemed to him like an intense fog. This trouble increased until March 19, when the patient found in the afternoon that he could no longer distinguish light from darkness.

I saw him on the following day. The man was much depressed, was suffering from severe pain in the occiput, and was very weak. He could not distinguish the strongest light, and, on pressure, the phosphenes were absent. He had a slight rotatory nystagmus which did not increase on directing the eye upwards, nor diminish when the eyes were directed downwards. The movements of the eye were free in all directions. The pupils were much dilated, and the iris appeared as a band about 1 millimetre in width. There was no reaction to light or to convergence. The conjunctiva and the transparent media were normal. The ophthalmoscopic picture of both eyes was almost the same. The optic nerve was pale with indistinct outline. The retina was hyperæmic. The arteries were somewhat increased in size and slightly sinuous; the veins, strongly undulated, were almost double their normal size. There were no spots nor hemorrhages. The patient was put on a milk diet, with castor oil. He was given mercurial inunctions (4 grammes every two days) and the lower limbs were put in a warm pack.

On the 26th, lachrymation and photophobia appeared in both eyes. The patient thought that he could distinguish whether any one was in his room, but when trials were made, it was found that this was not true. The iris was somewhat broader, but did not react. The ophthalmoscope showed that the white discs were bordered with a fatty, radial striation, which disappeared in the retina. The arteries were normal, and the veins much dilated. In the right eye an oval œdematous placque was seen about three times the diameter of the disc, situated near the upper temporal portion. Another smaller one (one-third the diameter of the disc) was found on the upper nasal side, and three others, still smaller, near the lower temporal side. There were no large placques in the left eye, but seven scattered placques of moderate size.

Considering this retinal œdema, 2 grammes of iodide of potassium were given daily, and the patient made to perspire every other day by means of salicylate of soda. On March 30th, the œdematous placques had disappeared, the veins were diminished in size, and the disc was in the same condition. April 2d, the arteries were of normal size, with the exception of a few ramifications with contracted extremities, and the veins were slightly dilated, but still very tortuous (Fig. 1). The disc was white, and still bordered with a diffuse circle of radial striations of a yellowish-gray color. In the right eye there were a few yellow œdematous spots on the upper external temporal side, and another below. There were also seen on the border of the disc, and at some distance from each other in various places, small white spots highly refractive and resembling hoar-frost.

While the yellow spots were readily absorbed by the sweating and returned at times in other places, the white spots remained fixed and

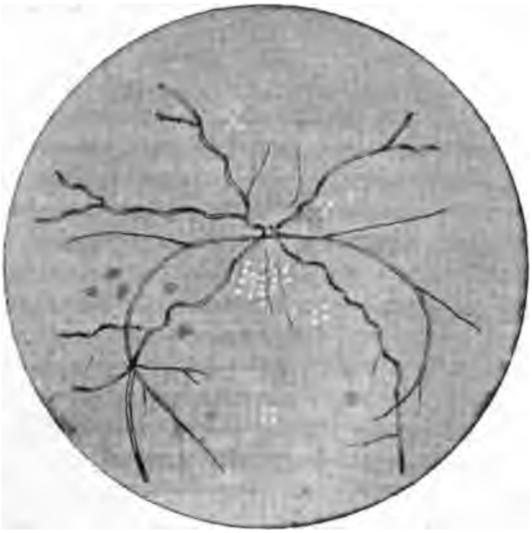

Fig. 1.

invariable until July. The appearance of the left eye was analogous, except for some difference in the arrangement of the spots of both colors. About April 15th, the patient began to distinguish large objects in his room, such as the stove, the table, the chairs, and hats. His greatest accomplishment was to tell the time on a clock with a white face and with black hands, which were about 1 centimetre broad. The sight was returning, more especially in the nasal portions of the retina. The patient saw better in semi-darkness, as a strong light caused dazzling. September 1st, vision was the same. There was a slight horizontal nystagmus, which the patient could overcome for a short time. The accompanying diagrams give the boundaries of the fields of vision. Color perception was abolished in both eyes; with 10 centimetre squares he saw yellow as the most brilliant, then green, then red, and finally, blue. Other persons always placed the green after the red in intensity. The luminous sense had suffered, and for the right eye was only $\frac{1}{15}$ (Treitel) and for the left $\frac{1}{10}$. More brilliant illumination did not modify this result, and weaker illumination diminished it. This examination was made by the light in my office.

At this same time the disc of the right eye was completely white and sharply defined; the veins had resumed their normal form, and were not contracted. The arteries were slightly contracted, principally at their termination. All the vessels had a thin, white streak, remnants of the old inflammatory œdema, which started at the point of emergence in the disc, and diminished to a distance of about half the diameter of the disc. All the spots had disappeared. The

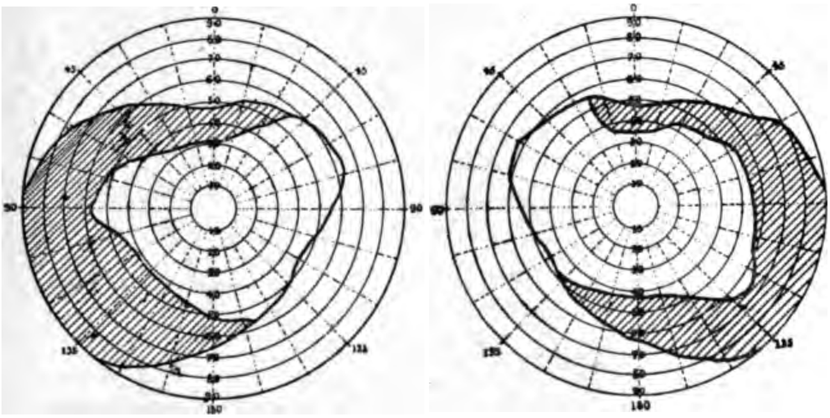

Fig. 2.

appearance of the left eye was similar, but the disc was of a greenish color. The thickening of the vessels appeared very plainly as white lines on a green ground. Slight traces of the white spots could still be seen, which appeared as a yellowish, almost invisible mass. The ere highly dilated, and did not react.

The patient had become quite strong, and could find his way about in the village, but with difficulty.

As soon as the inflammatory symptoms diminished, the patient had been given injections of strychnine and collyria of the same alkaloid. The slight improvement, if it did not come spontaneously, seems to me to have been due to the perspirations. The patient claimed that he could see better on the day after he had received these, and certainly the œdematous spots diminished and disappeared under their influence.

Summary of Published Cases.—I have omitted mentioning headaches in each case, as they were noted in all the cases, which were carefully observed.

1. HIPPOCRATIC WORKS. *Περὶ νούσων.* Book 2, 73. *Μέλαινα νουσος μέλαν᾽ εμέει.....καὶ τοίσι όφθαλμοῖσι οὐχ ὀρα.* (Ed. Littré, Vol. VII., p. 111.)

2. RIEDLIN, 1696, *Lineæ medicæ*, 2d year, p. 324. A woman vomited a large quantity of blood. She became amaurotic, but recovered her sight on the same day, and continued to see.

3. TREW, 1730, *Acta Acad. Cæs. Leop. Carolin. Natur. Curios.*, Vol. 2, observ. 52, p. 122. A woman, fifty years old, vomited about three pints of bloody fluid during the night. The affection was complicated with jaundice. She went to sleep in the morning, and woke about mid-day, amaurotic.

4. NOLTE, 1837, *Græfe und Walter's Journ. d. Chir. u. Augenhlkde*, Vol. XXV., p. 347. A soldier, fifty-eight years old, had four attacks of hæmatemesis and bloody stools. The treatment was free blood-letting. Five days later the left eye became amaurotic, and three days after that, the right eye became amblyopic and failed little by little, until it was completely amaurotic.

5. LAWRENCE, 1852, *Lancet*, Vol. I., p. 220. A man, forty-nine years old, vomited a large quantity of blood. On the sixth day after the hæmatemesis he noticed in the evening that with the left eye the sun was surrounded with a luminous circle. In the morning he was

blind. The patient remained under treatment for seventeen weeks. He had several slight temporary improvements, which enabled him to distinguish light from darkness, but ultimately was amaurotic.

6. O'REILLY, 1852, *Lancet*, Vol. I., p. 306. A man, fifty years old, lost a large quantity of blood. He became permanently amaurotic.

7. ED. JAEGER, 1854, *Ueber Staar und Staaroperationen*, p. 104. A man, seventy-two years old, had several attacks of bloody vomiting. After quite a long time he became amaurotic in the right eye. Jaeger applied several leeches behind the right ear. Twenty-four hours after their application the patient could see movements of the hand, and forty-eight hours later he could see fingers in the internal portion of the visual field. On the twelfth day he counted fingers readily and distinguished large objects.

The ophthalmoscopic image, the first published of amaurosis after hæmatemesis, did not in the first twenty-four hours after the amaurosis appeared, show anything abnormal, except arrested circulation in several places. On the second day all the vessels were increased in size and the arrest of the circulation was more clearly visible. After the application of leeches the circulation became more active and a slight cloudiness of the lens developed, which increased later. On the eighth day the arteries had diminished in size, but not the veins.

VON GRÆFE, *Græfe's Arch.*, Vol. V., 1, p. 149, classes this case among those of embolism of the central artery. It is true that the lapse of time between the last hæmatemesis and the appearance of the amaurosis was "quite long." Jaeger does not state its duration, but on the other hand, I must say that it is inadmissible that a man so skilled with ophthalmoscope as was Jaeger should not have seen the red spot in the macula. He states, however, that on the second day all the vessels were increased in size, and there is no question of a central contraction of the veins with peripheral dilatation of their calibre. In short, the only fact which bears any relation to embolism of the central artery of the retina is the arrest of the circulation.

8. VON GRÆFE, 1860, *Græfe's Arch.*, Vol. VII., 2, p. 143. A man, forty-three years old, had suffered several times in his life from attacks of hæmatemesis. The last time, two attacks occurred with an interval of two days, with loss of a large quantity of blood. On the second day after the last attack, he noticed in the evening that a gray-yellowish cloud obscured his vision, but he could distinguish

all objects. About three o'clock at night he awoke and found that he was totally blind. He remained in this condition until four months later, when Græfe saw him. From time to time the patient had subjective perception of colored lines, stars, etc. The pupils were moderately dilated and did not contract to light. The disc was white, the arteries much diminished in size, and the veins smaller than usual. No luminous perception.

9. VON GRÆFE, *ibid.*, p. 146. A man, fifty years old, came for consultation fifteen days after the commencement of amaurosis. He had had two attacks of bloody stools and a single hæmatemesis. Three days later, in the evening, he noticed a cloud before his eyes which thickened, and he became amaurotic within three days. Coincident with this, there was a slight paresis of the left hand and of the left buccal angle. With the ophthalmoscope the arteries appeared somewhat contracted, and later, white atrophy of the disc was revealed.

10. FIKENTSCHER, 1861, *Græfe's Arch.*, Vol. VIII., 1, p. 209. A man, forty years old, had suffered previously from hæmatemesis and bloody stools, with loss of a large amount of blood. Before the amaurosis appeared, only the latter were present. After ten days the patient noticed, about nine o'clock in the morning, that his sight was becoming dim, and he was soon completely blind. The pupils were moderately dilated and insensible to light. An ophthalmoscopic examination was made four weeks later, but was negative; in the left eye there were several small, clear and brilliant spots in the lower part of the disc. There was a slight improvement six weeks after the attack, which enabled the patient to distinguish a large outline and sharply drawn lines in moderate light. Three weeks after the accident sight was completely lost.

Fikentscher saw the patient again three years after the commencement of the amaurosis. The pupils were still dilated, and did not react to light. There was a slight nystagmus. The vessels of the conjunctiva were dilated. The retinal arteries were somewhat contracted, and the veins swollen. The disc was sharply outlined in the left eye, and the small spots mentioned above were still to be seen. In the right eye the disc was somewhat indistinct with some traces of pigment. Vision was *nil.*

11. FRONMÜLLER, 1862, *Memorabilien*, 7th year, p. 152. A man, fifty-one years old, lost a large quantity of blood by hæmatemesis and per rectum. He became blind on the same day. After several days it was found that the right eye was amaurotic; no phosphenes

on pressure. There was a slight degree of amblyopia in the left eye. Nine months later the patient's condition was improved, and he could read fairly large letters and distinguish distant objects. Ophthalmoscopic examination, made some weeks after the accident, was negative. The pupils had always been of the same size and reacted perfectly.

12. HERR, 1863, *Pract. Arzt.*, No. 4. This case was also communicated in 1865, by O. Sellheim. (*Zur Casuistik von ploetzlich eingetretener Amaurose nach Blutbrechen*, p. 17.)

A man, thirty-seven years old, had three attacks of hæmatemesis in four days, and bloody stools; the amount of blood lost was very great. Immediately after the last hæmatemesis he became amaurotic, and suffered from severe pain in the frontal region. After two weeks he could perceive the window, and in three months he saw distant objects. After a year he could count fingers at 5 metres. The visual field consisted of a band which extended from the centre to the supero-external periphery in both eyes. With the right eye he could read Jaeger No. 3, and with the left, No. 14, and with 8 D, No. 11. The pupils were dilated and immovable from the beginning. After three years, reaction was still slow, especially in the right eye. Ophthalmoscopic examination was not made until three years after the commencement. There was quite a discoloration of the disc verging on blue. The borders were not perfectly regular, the disc was somewhat contracted, and there was a slight excavation in both eyes. The vessels were normal.

13. SELLHEIM, 1865, *Zur Casuistik von ploetzlich eingetretener Amaurose nach Blutbrechen*, p. 14. A woman, fifty-three years old became suddenly amaurotic three days after an attack of hæmatemesis and bloody stools. On the sixth day she could distinguish light with the right eye, and on the twentieth, large objects, but only in a visual field similar to that of case No. 12. The left eye remained amaurotic. The pupils were immovable. Several weeks later the fundus of the eye was examined, and it was found that there was atrophy of the optic disc.

14. WERNHER, 1865, *in* Sellheim, *loc. cit.*, p. 21. A man, fifty-three years old, had two attacks of hæmatemesis and bloody stools within thirty hours. The left eye remained healthy, but on the second day he noticed flashes of light with the right eye. He could still distinguish light from darkness on the third day, but finally became amaurotic. He improved but very little. In this case also

the visual field for large objects consisted of a slit directed towards the supero-external part of the field. After four years the arteries and veins of the fundus of the eye were of smaller calibre than the vessels of the healthy eye. The optic nerve was at this time of a bluish-white color, and the pupil of the right eye (amblyopic) dilated when the left was closed. Later on it did not react.

15–17. MOOREN, 1867, *Ophthalmiatrische Beobachtungen*, p. 310. He mentions three cases which have no statistical value: "I have seen three cases of atrophy of the optic nerve and of the retina after hæmatemesis. The eyes, which before then had performed their functions perfectly, were totally blind afterward."

18. MOOREN, 1867, *ibid.*, p. 310. "In a fourth case there was a unilateral amaurosis resulting from the same etiology. In the other eye, in addition to the picture of atrophy of the optic nerve, vision was so weak that he could only count fingers at a distance of 1 metre."

19. JACOBS, 1868, *Berliner klin. Woch.*, Vol. V., p. 39. A woman, thirty-six years old, lost a large quantity of blood by two attacks of hæmatemesis within three days, and bloody stools for several days. Ten days after the second attack her sight was indistinct. The cloudiness increased, and five days later she was amaurotic. The pupils were enlarged from the commencement, and reacted slightly, but after the eyes became amaurotic, reaction was lacking. The patient remained blind. The fundus of the eye was examined eighteen days after the amaurosis became complete. There were venous dilatation, black spots, and hemorrhagic foci in the retinæ of both eyes.

20. HUTCHINSON, 1869, *Ophthalm. Hosp. Rep.*, Vol. VI., p. 218. A woman, forty-eight years old, had several attacks of hæmatemesis within three days. She suffered also from painful general convulsions. Two days after the last hæmatemesis, amblyopia appeared, which increased for a week. The woman could only see the largest letters of Snellen's scale at a distance of 40 centimetres. One year later the condition was the same. Nine weeks after the attack the pupils were of normal diametre, but reacted slowly, and the condition was the same after a year. Nothing special was observed on ophthalmoscopic examination nine weeks after the appearance of the amaurosis. The following year the discs were somewhat pale, the veins of normal calibre, and the arteries much contracted. The same appearance was seen in both eyes without other alterations.

21. Colsmann, 1869, *Zehender's klin. Monatsbl.*, Vol. VII., p. 1. A man, sixty-four years old, had five attacks of bloody stools in a day, and several attacks of hæmatemesis, with loss of a large amount of blood. Five days later, the patient discovered in the morning that he was blind. The amaurosis was complete. The pupils were moderately dilated without reaction. The media were transparent. Three days after the attack the optic nerves were very pale, the arteries much contracted, and the veins dilated. The following day dry cups were applied in several places. A slight amount of light was seen by the right eye in the nasal part of the retina. Warm fomentations and stimulant inunctions were applied about the eyes. The left eye became hard, and two paracenteses of the cornea were performed, and later, an iridectomy of this eye. There was temporary improvement, but ultimately the eye remained amaurotic. With the right eye there was perception of light on the temporal side of the visual field. Six weeks after the commencement of the amaurosis the optic disc was white and the veins were also contracted.

22. Kugel, 1869, *Wiener med. Presse*, Vol. X., p. 22. A man, thirty-five years old, lost a large amount of blood by hæmatemesis. Three days later he became amaurotic in the right eye. Unfortunately, a description of the fundus of the eye is not given. Little by little the patient regained his strength and the amaurosis disappeared.

23. Colsmann, 1870, *Berliner klin. Woch.*, Vol. VII., p. 386. A man, forty-eight years old, lost a large quantity of blood by hæmatemesis and per rectum. Several days later he was amblyopic in both eyes with contraction of the visual field. Fifteen days later the fundus of the eye was examined and it was found that the discs were white and the central vessels contracted. The pupils did not react well and they were unequally dilated. The patient could with difficulty decipher Jaeger No. 5 with the right eye, and No. 7 with the left. Three weeks later he could read two numbers higher with each eye. Injections of strychnine had been given. The limit of eccentric vision extended almost to the macula in the left eye, and in the right was a little greater above and below.

24. Schweigger, *Handbuch der spec. Augenh'lk'de*, 1st ed., p. 532. A person became amaurotic after hæmatemesis. Eight days afterwards the optic nerves were ill defined on account of a cloudiness which extended over the retina for a distance equal to the diametre

of the disc. In one eye there was a slight retinal hemorrhage near the optic nerve, the latter being somewhat pale. The vessels were normal. Later the optic nerves became of a yellowish-green color (by daylight). They were very sharply outlined and presented the appearance of atrophy. The cloudiness and the hemorrhage had disappeared and only the arteries were somewhat contracted.

25. SAMELSOHN, 1872, *Græfe's Arch.*, Vol. XVIII., 2, p. 226. A man, fifty-three years old, had a severe attack of hæmatemesis. He was in a condition of syncope and, when on the following day he regained consciousness, he found that he was amaurotic. After nine months there was spontaneous improvement which enabled the patient to find his way about alone. After temporary improvement three years later this condition remained permanent. The pupils, four years after the attack, were somewhat dilated, but reacted perfectly to light. The fundus of the eye was normal except that the optic nerve was white and sharply defined. The upper part of the right disc was of normal color, and also the supero-external segment of the left. The visual field of the left eye only existed in the lower nasal side, and in the right only below. There was no central vision in the right eye. In the left, $V = \frac{1}{2}$, with presbyopia $\frac{1}{14}$.

26. SAMELSOHN, 1873. *Tagebl. 46te Vers. deutsch. Naturforsch. und Aerzte Wiesbaden*, p. 160, and afterwards with fuller details in *Græfe's Arch.*, Vol. XXI., 1, p. 162 (1875). A woman, seventy-three years old, lost a quantity of blood per rectum; fell into a condition of collapse. Ten days afterwards she asked if there was any light, although it was full daylight. The writer examined her eight days after the commencement of the amaurosis. The exterior of the eyes and their tension were not modified. The pupils were not dilated, and reacted perfectly to light and to convergence. In the left eye the amaurosis was complete; in the right there was a slight sense of light but not of projection. In the fundus of the right eye the disc was sharply defined and of a reddish-gray color. The arteries were slightly contracted and the veins dilated. Outside of the disc, at a distance of about half its diametre from it, was seen an exudate the size of a millet-seed situated in the external retinal layers, and of a gray color. The appearances were the same in the left eye but there were three exudates: one on each side of the disc, in the horizontal meridian at a distance equal to the diametre of the disc, and the third above and internal to the spot on the nasal side. Below and inside was a brilliant white spot. Samelsohn gave an injection of strychnine. On

the following day there was sensation of light in both eyes with excellent projection except in the external part of the left eye. There was no change in the appearance of the fundus of the right eye, but in the left there was a large extravasation of blood, of bright-red color, triangular in form, and situated in the external layers of the retina. Its base occupied half the circumference of the disc, and the summit was directed almost horizontally towards the external exudate. Improvement continued, and six weeks after the commencement of the amaurosis the left eye had V = 1 and the right eye V = $\frac{3}{5}$. The visual field and color perception were intact and the fundus of both eyes had regained their normal appearance.

27. Manz, 1873. Discussion of the preceding communication. (From *Nagel's Jahresber.*, p. 382.) From intestinal loss of blood a woman became amblyopic, but unequally so in the two eyes. The fundus of the better eye was normal, and in the other the disc was of a gray color.

28. Manz, 1873, *ibid.*, p. 382. In another case there was a scotoma, which improved gradually in the direction of the periphery.

29. Horstmann, 1873, *ibid.* (From Fries, *Beitr. z. Kenntn. d. Ambl. und Amaur. n. Blutverl.*, p. 114.) I am not certain that this was really a case of hæmatemesis. The fundus of the eye was not described There was improvement, and injections of strychnine were given.

30. Mooren, 1874, *Ophthalmol. Mittheil.*, pp. 83 and 90. Six persons became amblyopic (one in one eye) as the result of hæmatemesis, metrorrhagia, etc.

31. Schweigger, 1875 (1), *Handb. d. spec. Augenheilk.*, 3d ed., p. 522. As the result of hæmatemesis a person became amblyopic. V = $\frac{2}{3}$ in both eyes, with contraction of the visual field. There was pronounced optic neuritis in one eye, while in the other only the upper half of the nerve was affected.

32. Samelsohn, 1875, *Græfe's Arch.*, Vol. XXI., p. 155. A man, forty-seven years old, a heavy drinker, lost a large amount of blood by hæmatemesis and by rectum. At short intervals he had two more similar attacks, and remained in bed for four weeks. Eight days after the last attack, he observed in the morning that his sight was quite dim. Six weeks after the first hæmatemesis, Samelsohn examined him. The haze was situated in the middle of the visual

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(1) According to Horstmann, this is the case described as No. 45. (*Klin. Mon.*, Vol. XVI., p. 145.)

field, especially when in the street. Brilliant illumination had no effect upon him, but distance and duration of the luminous impression rendered it more dense. With each eye he could see Sn. XX at twenty feet distant. The cloud soon became denser, and was transformed into a scotoma. The patient could read Sn. 1.5 (with correction), and then the cloud appeared more slowly. The visual field and color sense were intact. The discs were not distinctly outlined, the arteries were contracted, and the veins enlarged. Total re-establishment was brought about by tonic treatment and injections of strychnine and internal administration of iron.

33. NAGEL, 1875, in Fries, *Beitr. z. Kenntn. d. Amblyop. und Amaur. nach. Blutverlust,* 1875, p. 117. An old man had an attack of hæmatemesis, and became permanently amaurotic.

34. NAGEL, 1875, *ibid.,* p. 118. A woman, forty-five years old, lost a large quantity of blood by hæmatemesis and by rectum. Severe prostration followed, and when the woman regained consciousness, she found that the left eye was completely blind. This had occurred in the course of the third week after the attack. The right eye was normal. The left eye remained amaurotic. Three months later, the pupils were of equal size, but on closing the right eye, the left pupil dilated, and no longer reacted. Synergic movements with the right pupil were perfectly performed. There were a slight cloudiness and a few opacities in the lens. The optic nerve was atrophied and white, the arteries and veins were thin and difficult to distinguish, and the choroid was slightly pigmented.

35-36. STRUBE, 1875, in Fries, *loc. cit.,* p. 120. A man and a woman became amaurotic about one week after attacks of hæmatemesis.

37. STRUBE, 1875, *loc. cit.,* p. 120. A man of strong constitution had an attack of hæmatemesis with collapse. An amblyopia suddenly developed, which became a total amaurosis in twelve hours. This condition was permanent.

38. STRUBE, 1875, *loc. cit.,* p. 120. Another man became amblyopic as the result of hæmatemesis. Six weeks later the visual fields of both eyes were in the form of a slit, which permitted him to find his way alone.

39. STRUBE, 1875, *loc. cit.,* p. 120. A man, forty-three years old, suffered from hæmatemesis and melæna. Fifteen days later amblyopia developed. The patient could read with correctness Jaeger No. 8. The visual field was normal. The fundus of both eyes was

normal and presented no ulterior change. At the end of half a year vision was normal.

40. STRUBE, 1875, *loc. cit.*, p. 121. A man, fifty years old, suffered from hæmatemesis and lost a large quantity of blood per rectum. The patient remained comatose for a week, and, on recovering, discovered bilateral amblyopia. Ten weeks later he could see movements of the hand at a distance of three feet in the supero-external part of the field of the right eye. With the left he could read Jaeger No. 24 at 27 centimetres, but nearly the entire internal half of the retina did not perform its function. After four weeks of treatment, the patient could read Jaeger No. 3 with + 2 D. The right eye remained in this condition and the left eye regained half of the lost visual field.

41. NAGEL, 1875, *ibid.*, p. 121. A woman, thirty-six years old, became amblyopic in both eyes after hæmatemesis. Gradually perception of light returned in the left eye. Three years later Nagel examined her, and found in the left eye $V=\frac{15}{100}$, and she could read Jaeger No. 7 at 25 centimetres. The visual field was contracted in all directions and especially in the internal part. This condition remained, but vision increased to $\frac{15}{40}$, and at near point the patient could easily read the words of Jaeger No. 2. The right eye remained amaurotic. There was no pupilary reaction in the right eye, and this was not mentioned for the left, hence, I conclude that the latter was normal. The fundus of the eye was not described.

42. HARTL, 1875, *Zur Casuistik von Amaur. nach. Hæmat. und anderen Blutungen*, p. 16. A woman, fifty-eight years old, had a severe attack of hæmatemesis and went into a condition of collapse. She was able, however, to continue her work for a week, and not until the eighth day did the left eye become amblyopic. In two days it was amaurotic. The right eye was also affected, but less seriously. She came for consultation a year and a half afterwards. The pupils were dilated, the optic disc of a white color, the arteries contracted, and the veins dilated. There was also pigment dissemination of the entire choroid. The left pupil did not react, and the right only slowly. With the right eye she read Sn. $\frac{8}{70}$. After treatment with strychnine she read Sn. 20 with the right eye at 17 centimetres. The left eye remained amaurotic.

43. STAN, 1875, *Beitr. z. Kasuist. v. ploetzl. eingetret. Amaur. n. Hæmatem. Greifswald.* A man, twenty-six years old, lost his sight several days after severe attack of hæmatemesis. With the right

eye, movements of the fingers were seen at 16 centimetres, and with the left eye fingers were counted at 60 centimetres. The visual fields were much contracted, but color perception was normal. The right disc was of a greenish-gray color, and only sharply defined on the nasal side. The vessels were thin, especially the arteries, and near the disc they were fluted. The lower temporal part of the left disc was swollen, with one vein somewhat indistinct, and another sinuous. Under tonics and injections of strychnine, the left eye improved so that he read Jaeger No. 7 with + 3.5 D. Fifteen days later, the visual field of the left eye was only lacking in the external part, and that of the right was of very small extent and only on the nasal side. Ultimately, both eyes presented the picture of atrophy of the optic nerve. With the left eye he read Jaeger No. 12, and with the right No. 11, at 30 centimetres. Dyschromatopsia set in which rendered the prognosis unfavorable.

Stan states in his thesis that after profuse uterine hemorrhages amaurosis never occurs. Communications on this subject would prove the contrary, and I could mention at least sixty cases observed by various authors.

44. FOERSTER, 1876, in *Græfe-Sæmisch,* Vol. VII., p. 73. A girl had a severe attack of hæmatemesis. Twelve days later the discs were scarcely visible, especially in one eye. The retina was entirely clouded and of a white color, with numerous small blood extravasations. No red spot at the macula. The vessels were of small calibre. Several weeks later, the extravasations and cloudiness of retina had disappeared. Vision, according to the patient's statement, had not suffered. Three months after hæmatemesis, the retina, the optic disc, and vision were normal.

45. HORSTMANN, 1877, *Charité Annalen,* 1875, p. 534 (1), and *Klin. Monatsbl.,* Vol. XVI., 146. A man, forty years old, who had previously suffered from attacks of hæmatemesis, became amblyopic three days after the last attack. Externally, the eyes were normal. The pupils were moderately dilated and, fifteen days after the hæmatemesis, reacted to light. The optic disc of the right eye was cloudy in its upper portion, and this cloudiness continued over a space equal to two discs. The arteries were normal and the veins not sinuous. The temporal portion of the left optic nerve was not cloudy, but the remainder was, and this extended towards the

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(1) According to Horstmann, this is Schweigger's case, No. 31 of this article.

nasal side for a distance of half a disc diametre. The lower and inner portion of the right visual field was abolished, and in the left eye a large concentric space was lacking. Vision with + 1.5 D. was $\frac{20}{70}$ in the left eye, and $\frac{20}{30}$ in the right. Six weeks after the attack all the ophthalmoscopic signs had disappeared. The discs were of a whitish appearance, and the arteries smaller than normal. The visual field was the same, and vision was $\frac{20}{20}$ in the right and $\frac{20}{30}$ in the left eye. Three years later the visual field was the same, and vision with correction was $\frac{6}{6}$ for the left and $\frac{6}{6}$ for the right.

46. LANDESBERG, 1877, *Zehender's klin. Monatsbl.*, Vol. XV., p. 95. A man, sixty-one years old, vomited a large quantity of blood. He was put to bed, and when he awoke was blind. In spite of tonic treatment, leeches on the temples, an iridectomy on each eye, the patient remained blind. The writer saw him two years and a half after the accident. The pupils were immovable. There was total amaurosis in the right eye, and in the left, possibly a slight perception of light. The discs were of bluish color, atrophic and sharply defined. The arteries were much contracted, and the veins slightly. The retina was atrophied in places, and there were several pigment masses in the upper external periphery (inverted image).

47. LEBER, 1877, in *Græfe-Sæmisch*, Vol. V., p. 902. A young man had a severe attack of hæmatemesis. The right eye became completely amaurotic. Central vision of the left eye was normal, but only the upper external portion of the periphery performed its function. The optic nerves presented the appearance of atrophy, and the arteries were contracted.

48. LEBER, 1877, *ibid.*, p. 903. A man, fifty-two years old, had several attacks of hæmatemesis. Two weeks later, he noticed that the sight of the right eye was obscured. There was improvement during the following two weeks. By means of exercises vision increased in half an hour, from the ability to count fingers, to $\frac{20}{70}$. The visual field was only free in the upper part and elsewhere was contracted. There was nothing abnormal in the fundus of the eye with the exception of slight pallor of the disc.

49. HIRSCHBERG, 1877, *Sitz. Ophth. Ges. Heidelberg*, p. 56. A man, fifty-two years old, had three attacks of hæmatemesis in three days. Three days later the patient could read ordinary print with +6 D for each eye. The left disc was white and cloudy, and the large vessels of the retina were slightly contracted, especially the arteries. In the right eye there was the picture of neuritis. The disc was

not prominent, and the veins were invisible in places. Two days later the patient noticed that the right eye became amblyopic, and eight days after the last hæmatemesis vision was $\frac{1}{30}$ in the right, and $\frac{1}{6}$ in the left. There was a well-pronounced neuro-retinitis in the eye without vascular dilatation. A white cloud extended from the optic nerve to the periphery, especially in the horizontal meridians. There were numerous hemorrhages, some linear, and some of irregular form. In the left eye all the vessels were dilated, and the calibre of the veins was double that of the arteries. All the veins were sinuous and pale in color. The disc was sharply defined in the upper part and of normal appearance, but the main portion was clouded and white. There had been no hemorrhages. The white portion of the disc was continued along the lower temporal vein as a gray streak. Below the macula was a well-defined white spot, and there was also another near the disc.

Two days later, the tenth after the last hæmatemesis, the right eye became amaurotic, while with the left eye he could read quite small print with correction. There were a few more small hemorrhages in the right eye, and in the left the entire disc was cloudy. Twenty-two days after the hæmatemesis the hemorrhages and white spots were almost entirely reabsorbed. Vision was *nil* in the right eye, and one-quarter in the left. The right disc was white, and the left rose color.

In 1881, *Sitz. Ophth. Vers. Heidelberg,* p. 69, and in 1882, *Zeitschr. f. klin. Med.* Vol. IV., Nos. 1 and 2, Hirschberg again saw the man in question. He had had another hæmatemesis on January 13th, 1881, and still another on the 19th. On the following day, the author found that the right eye was amaurotic. The pupil was dilated and did not react to light. The disc was atrophied, and the arteries contracted. He could see with the left eye, but the disc was somewhat white. On the 24th, he had another attack of hæmatemesis, which caused his death. On autopsy a carcinomatous ulcer of the stomach was found near the pylorus. The right optic nerve was two millimetres in thickness. The nerve fibres were replaced by connective tissue, giving the picture of total atrophy. The layer of nerve fibres of the retina was lost.

The left optic nerve was normal, except in its peripheral part, about one-third of the periphery and one-eighth of its thickness. In the atrophic parts there were numerous vessels with thickened walls without thrombosis. Near the eyeball, the atrophic portion of the nerve increased in size, but here and there were several nerve fibres mingled with connective tissue. The larger part of the optic disc was normal, while the other, which was continuous with atrophic portion of the nerve, was atrophied. The corresponding portion of the retina revealed a large number of nuclei in the internal layers (layer of nerve fibres and ganglionic layer). No hemorrhage into the sheath of the optic nerve was found. The process seemed to be one of ascending atrophy.

50. HORSTMANN, 1878, *Zehender's klin. Mon.*, Vol. XVI., p. 149. A man, twenty-eight years old, had an attack of hæmatemesis followed by melæna. Seven days later his sight disappeared completely in six hours. After fifteen days he could distinguish light, and in four weeks could see large objects. This condition lasted until the author examined the patient several months later. The pupils were moderately dilated and reacted slowly to light. The retinal veins of both eyes were normal, the arteries somewhat contracted, and the discs white. With the left eye he counted fingers at 3.5 metres, and with the right at 1.5 metres. The visual fields of both eyes were much contracted.

51. HORSTMANN, *ibid.*, p. 150. A man, forty-four years old, had had an attack of typhoid fever three years before. Since that time his stomach had troubled him, and after three years, attacks of hæmatemesis occurred during two consecutive days with loss of a large amount of blood. Eight days afterwards, he found on awakening in the morning that he had become completely amaurotic. One year later Horstmann examined him, and found the pupils dilated with no reaction to light, the optic discs white, and the vessels contracted, the arteries more than the veins.

52. LITNEN, 1880, *Berl. klin. Woch.*, No. 49. A man, thirty-two years old, had been troubled for some weeks with his stomach (vomiting, but no blood). He was admitted to the hospital, and there it was found that the fundus of the eye was normal, except for the presence of a few pigment spots, traces of former hemorrhages. While in the hospital, several retinal hemorrhages occurred, some with white centres. One day he lost 700 c. c. of blood by hæmatemesis and a large amount by melæna. Two days later there were several hemorrhages in the retina, in the form of points, and also larger spots. In fifteen days he had another attack with loss of 800 c. c. The pupils were dilated and reacted very slowly to light. The last hæmatemesis had taken place in the night and on the following afternoon it was found

that the disc was pale with diffuse border and all about it was a white cloud which did not reach to the macula. There were blood spots and contraction of the arteries. There was slight radial striation of the disc with indistinct vessels. Two days later another hemorrhage caused his death. Autopsy revealed a perforation of an ulcer of the stomach, which led into a small cavity communicating with the pancreas. There was thrombosis of the splenic artery. The day before death the symptoms of neuro-retinitis were more pronounced.

53. Hoffmann, 1883, *Klin Mon.*, Vol. XXI., p. 171. A man, forty-seven years old, had an attack of hæmatemesis followed shortly by two others, with considerable loss of blood. Two days after the last hæmatemesis he became suddenly amaurotic, and this lasted for some time. As there was a gradual improvement, the patient did not come for consultation until fourteen weeks after the commencement. The left pupil was somewhat more dilated than the right, but both reacted, although the left was slow. The fundus of the left eye was normal except for the optic nerve, which was white. The disc of the right eye was white in the upper part, while the lower part was normal in color. Only movements of the hand could be seen with the left eye, and with the right, vision was $\frac{6}{18}$, and large print was read with difficulty. The author examined the visual field and found that the lower portion was lacking, and that the remaining portion was concentrically contracted.

After an injection of strychnine, vision increased in the right eye to $\frac{6}{12}$, and with the left eye fingers were counted near the eye. After the third injection the right eye improved to $\frac{6}{6}$, and with the left, fingers were counted at 1 and $\frac{1}{4}$ m. After the sixth injection he read Jaeger No. 2 at 11 centimetres with the right eye, and counted fingers at 3 metres with the left, with an eccentric point of fixation above and outside. Colors were not recognised with the left eye, and the luminous sense (Forster's apparatus) of this eye was diminished, while the right eye recognised colors almost at their normal limit, but always in the upper portion of the visual field.

54. Ulrich, 1883, *ibid.*, p. 183. A woman, twenty-five years old, was admitted to the hospital in an anæmic condition, as the result of hæmatemesis. One week after the last hæmatemesis, Ulrich only found a slight pallor of the disc. Two days later there was another attack of hæmatemesis, and ten minutes after it the pallor of the discs was increased, they were sharply defined, and there was a slight

excavation. The arteries were contracted and indistinct in the periphery. The veins were normal, or possibly overcharged with blood. Their deep color became a bright red on the disc. There were also brilliant white placques and numerous hemorrhagic spots—some with white centres. Ulrich concludes that several of them came directly from the retinal vessels. The patient could count fingers, but could not read. One week later the difference in color of the intra- and extra-papillary parts was almost abolished. Seven weeks later everything had been reabsorbed, vision was 1, and the visual field normal.

55. GROSSMANN, 1883, *Pesther med. chir. Presse,* Vol. XX., p. 49. (Translated in *Arch. d'Ophthalmol.,* Vol. III., p. 135.) A man, thirty-one years old, had a severe attack of hæmatemesis. On the sixth day he was amaurotic, but three days later, could distinguish large objects. The pupils were highly dilated and reacted but slightly to light. The optic discs of both eyes were veiled, and the cloud extended over the retina, especially in the right eye. There were also small hemorrhages around the optic nerve. At the macula was a blood-red spot of circular form. The arteries were contracted and veiled in some places. There was no sight in the left eye, and with the right, fingers were counted at 50 centimetres. After five weeks the neuro-retinitis had improved, but the amaurosis was complete, and could not be modified.

56. DUJARDIN, 1884, *Journ. des sciences med. de Lille,* p. 769. I have not been able to consult the original, and can only communicate a summary of this case. An old man, seventy years old, became almost completely blind in both eyes after hæmatemesis. The ophthalmoscopic image revealed atrophy of the optic disc.

57. WESTERFIELD, 1886, *Ueb. Amaur. nach Blutverlusten,* p. 3. A man, sixty-three years old, had in the course of his life suffered from severe gastro-intestinal affections and malæna. Finally, he had an attack of hæmatemesis, and vomited about a quarter of a litre. On the following day he noticed that his vision was dim, and that he saw as though through a cloud. On rising, everything suddenly became dark, and he was amaurotic. One month later the fundus of the right eye was pale, and the disc gray, with diffused borders. The arteries were very much contracted, and the veins to a less degree. Near the disc were seen small white foci situated underneath the vessels. These foci were scattered through a space equal to several disc diametres. A little outside of the macula were seen

irregular red foci—probably the remains of hemorrhages. The appearance of the left eye was similar, but the veins were fuller. There were no white spots but clear traces of an extravasation outside the macula. The pupils were dilated with no reaction to light; the amaurosis was absolute.

58. WESTERFIELD, *ibid.*, p. 7. A girl, five years old, had a nosebleed and afterwards a copious hæmatemesis. Two days later the same phenomena recurred, but with less loss of blood. On the following day it was found that the child was blind. One month later the pupils were greatly dilated, and the discs were pale and diffuse. Five days later, after four injections of strychnine, the amaurosis remained the same. In the right eye the external portion of the disc was white and sharply outlined, while the remainder was hazy. The arteries were thin. In the left eye the disc was pale and ill-defined, and in the upper portion was a hemorrhage resting against the border of the disc. There were no retinal hemorrhages.

59. LAQUEUR, in Westerfield, *ibid.*, p. 9. A woman, forty-three years old, had attacks of hæmatemesis and malæna during four or five days. On the last day she noticed a cloud before the left eye, which increased, and in ten days this eye was completely amaurotic. Three weeks afterwards Laqueur saw the patient, who, four days previously, had had another attack of malæna. The pupil did not react to light, but contracted sympathetically with the other. The disc was very pale, the arteries were filiform, and disappeared near the periphery. The veins were very thin, with the exception of one, which was well filled. There were no foci and no hemorrhages. With the right eye she read quite fine print, and under the ophthalmoscope there was nothing but a well-marked contraction of the vessels. Five days later there was a linear hemorrhage in this eye, outside of and below the disc. A few weeks later the patient died.

60. ZIEGLE, 1888, *Ziegler und Nauwerck's Beitr. z. path. Anat.*, Vol. II. (From the review in *Centr. Bl. f. Augenh.*, Vol. XII., p. 128.) A woman had a severe attack of hæmatemesis. Three days later she became amblyopic and soon completely amaurotic. The optic discs were diffused, and there was a white infiltration around them. The arteries were contracted, and the veins sinuous. Twenty days after the commencement of the amblyopia the woman died after another hemorrhage. On autopsy no macroscopical changes were found in the optic nerves or their sheaths. Under the the microscope there was fatty degeneration of the optic nerve and

its intra-ocular expansion, the maximum being in the lamina cribrosa.

61. HIRSCHBERG, 1892, *Centr. Bl. f. Augenh.*, Vol. XVI., p. 257. A man, forty-five years old, vomited a dozen times consecutively, and then had a severe hæmatemesis. Eight days later he found that the left eye had become amaurotic. Fifteen days later the function of the right eye was normal. The disc was normal and the arteries were well filled. There were five bluish foci scattered through the temporal side of the retina, but otherwise it was normal. In the left eye there was no perception of light, and the pupil did not contract. The optic disc was pale, yellowish, and ill-defined. The arteries were contracted, especially the temporal branches. The disc was surrounded by an œdema extending beyond the macula, which appeared red in contrast. On the border of the papilla was a hemorrhage extending in a radial direction. There was radial striation in the retina. In both eyes there were peripheral pigment spots of long standing. Vision of the right eye was $\frac{15}{18}$, and with correction he read Sn. $\frac{1}{2}$ at 36 centimetres. The visual field was normal. Three months later, all the phenomena had disappeared, except that the arteries remained contracted with thickened walls.

62. PANAS, 1894, *Maladies des yeux*, Vol. I., p. 734. An anæmic soldier of Tonkin had attacks of hæmatemesis. Amaurosis in both eyes with white atrophy was the result. The eyes were affected consecutively.

63. See page 13.

64. See page 13.

QUININE AND MALARIAL AMAUROSIS

By Dr. **L. DEMICHERI**,
Chief of Dr. de Wecker's Clinic.

Quinine amaurosis is a rare affection in our clinic, since it is unnecessary with us to administer maximum doses of quinine. It is in warm, marshy countries, where malarial fevers occur in all their severity, and where the most pernicious forms are frequent, that poisoning from quinine is commonly seen.

But as intermittent fevers also cause more or less disturbances of the optic apparatus the question naturally presents itself in practice, of a distinction between the miasmatic cause and the quinine cause of the ocular disturbances. This question presents itself in connection with a patient who came to the clinic of the Rue Cherche-Midi, and my preceptor, Dr. de Wecker, has persuaded me to publish the case. The following is a description of this interesting case:

Case.—Sister N——, fifty-four years old. She had had typhoid fever at the age of fifteen, and scarlet fever at twenty-four. Her calling as a sister of St. Vincent-de-Paul had obliged her twelve years ago to go to Panama, and there, one year after her arrival, she suffered from malarial fever of somewhat irregular form, with paroxysms every five or six days. These paroxysms were well described by the patient in their various stages of cold, heat, and sweating. As treatment she took from 1 to 1.50 grammes of sulphate of quinine every day, but never exceeded this dose.

Nine years ago, that is, two years after she began to suffer from intermittent fever, and without having left Panama, she had a pernicious attack of comatose form, with loss of consciousness for twenty-four hours. During this attack, 2 grammes of sulphate of quinine were given her by the mouth, and 4 grammes administered hypodermatically.

On recovering from the attack, the patient complained of great weakness, of gastric distress, with vomiting, and ringing in the ears, without deafness. There was no headache and no other general symptoms. But she soon discovered that sight was gone. There was complete loss of luminous perception. The physicians who treated her made numerous efforts with candles and tapers to discover some trace of retinal sensitiveness, but they were forced to conclude that there was absolute loss of sensitiveness of the retina and of the optic nerve.

The feeling of great weakness and the gastric distress disappeared rapidly in the course of a few days and only the auditory and visual disturbances persisted. The ringing in the ears did not disappear until one year after the comatose attack. As for the vision, the patient remained blind and without luminous perception for a month. After that time she began to recover, but somewhat vaguely, central perception of light, and, as she expressed it, it was "like a white pearl attached to a black curtain."

Then, vision gradually improved for a year and a half, so that the patient was finally able to go about unaided. As treatment blisters were applied to the neck, strychnine pills were administered, and strychnine ointment was applied to the temple. Sulphate of quinine was also administered in small doses to combat the malarial infection, but as the congestion from minimum doses of this substance immediately produced a diminution in vision, this medication was abandoned.

Five months after the pernicious comatose attack, her community ordered her to leave Panama, and she came from there to Paris. On account of a slight diminution in vision, which she believed had lasted for two years, she took advantage of her visit to this city to come to the clinic in the Rue Cherche-Midi. This was early in June of that year.

On examining her eyes, I found that the pupils were normal size and mobile, and the media transparent. The discs of both eyes were very pale, of normal size, and with sharply-defined borders. The nerve tissue was perfectly transparent and nothing could be found suggesting a suffusion or a former neuritic inflammation. The central vessels were very thin, especially the arteries. The latter on examination with the inverted image were almost invisible. With the erect image they appeared as small red filaments without appreciable alteration in their walls. The veins were somewhat less contracted, but were almost half their physiological calibre.

Functional examination for the visual acuity gave :

OD. H 1 ; $V = \frac{1}{3}$
OS. E ; $V = \frac{1}{6}$ with difficulty.

The visual field for white was concentrically contracted 20 degrees in all directions. Colors were perfectly perceived, and, on campimetric examination, I found 15° for blue, 12° for red, and 10° for green.

The patient was given hypodermic injections of strychnine, and fifteen days afterwards the vision of each eye was $\frac{1}{3}$. The visual field had not enlarged.

The sister was obliged to leave Paris, and I have not seen her again.

The first question which arises from considering the history of this case is whether the amaurosis which appeared when the patient recovered from her pernicious attack was a result of this attack or of the administration of 6 grammes of sulphate of quinine.

Many writers have studied the visual disturbances which acccompany malaria.

First of all should be mentioned the careful investigations of Dr. Poncet (of Cluny), who has contributed so much to this question. Dr. Poncet, in an interesting article on malarial retino-choroiditis (1), has shown that if ophthalmoscopic alterations are scarcely appreciable in only a small number of patients, on the other hand, under the microscope the proportion becomes much greater, and chorio-retinal alterations are the rule.

Dr. Poncet in his article gives as malarial lesions optic neuritis, peripapillary œdema, extravasation of white cells, and obstruction of the vessels of the retina and the choroid by the white cells, which are multiplied and filled with pigment. These pigment emboli are the origin of numerous red hemorrhages, small in the periphery and large at the posterior pole.

The same alterations which Kelsch and Kiener found in the liver and the kidneys, Poncet finds also in the retina and the choroid of all patients who have died from malarial cachexia or pernicious attacks.

Unfortunately, the ophthalmoscope is incapable of always informing us of the existence of these lesions, on account of their microscopical nature, or their localisation beyond our field of observation. The word amblyopia has not yet completely disappeared from our nomenclature, and some authors (2), in opposition to Dr. Poncet's opinion, believe that there are no lesions in the cases of temporary amblyopia which accompany slight fevers.

Malarial amblyopia may be intermittent and temporary, and accompany the ordinary febrile paroxysms as well as the pernicious attack. In such cases the visual disturbance decreases and disappears with the sweating stage.

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(1) PONCET. (*Annales d'Oculistique*, 1878.)

(2) TEILLAIS. *Société Française d'Ophtalmologie*, 1886.

Amblyopia and amaurosis may also be the permanent results of intermittent fever.

In cases of pernicious fever, the patient sometimes recovers from coma completely amaurotic, and this condition lasts for some time (1). The duration of the amaurosis varies from a quarter of an hour to an hour, and longer.

But it should not be forgotten that when the visual disturbance is pronounced or permanent, there will almost always be found some morbid signs in the fundus of the eye (optic neuritis, peripapillary disturbance, and hemorrhages), in a word, the retino-choroiditis of Poncet. In addition to these lesions Dr. Despagnet has recently described a case of infectious retinal arteritis (2) resulting from a pernicious attack of malarial fever, which caused complete amaurosis of long duration.

It will be seen that we are far removed from the clinical picture presented by my case. After coma, lasting twenty-six hours, the patient regained consciousness, and all the general disturbances disappeared with that singular rapidity which constitutes a clinical peculiarity of these comatose attacks (3). With this patient, only the ocular and auditory disturbances were lasting. It is an important fact that the tenacity of these two symptoms is characteristic of quinine-poisoning.

The ophthalmoscope is a valuable aid in establishing the differential diagnosis of quinine-poisoning. At the beginning of the amblyopia or the amaurosis the discs are seen to be remarkably white, chalky or snow-white in pronounced cases, and there is great contraction of the retinal vessels, which may render their examination difficult, and they may even be invisible at a short distance from the disc. A still more important sign is the persistence of these lesions, which have been found in a well-marked condition many years after the poisoning, although the patients have regained normal vision.

Contraction of the retinal vessels as observed in malaria, is a temporary phenomenon of short duration. When this contraction is permanent it is allied to neuro-retinitis (Poncet) or arteritis (Despagnet), and it is interesting to know that this contraction is confined to the arteries and does not affect the veins, which are always more or less dilated.

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(1) NUEL. In *Traité de Wecker et Landolt*, Vol. III., p. 679.

(2) *Société Française d'Ophtalmologie*, 1894.

(3) LAVERAN and TEISSIER, *Pathologie médicale*.

Is it possible to compare the vascular contraction of malaria with that presented by my patient, which affected both arteries and veins and which persisted for eight years?

Furthermore, the condition of the vascular walls is of importance. In quinine-poisoning there is nothing but the filiform condition of the retinal vessels, possibly a decided spasm, and none of the more marked alterations of the vascular system, which are the signs of a more or less recent inflammatory condition brought about by malarial infection. The disc, also, should be considered. Its pallor is not accompanied by cloudiness or loss of transparency of the nerve tissue, and there is no suffusion of its outlines. In what dose can sulphate of quinine produce amaurosis?

The toxic equivalent of sulphate of quinine is 0.08 gramme (Bouchard), that is, for a man weighing 60 kilogrammes, a dose of 4.80 grammes may produce poisoning. But we also know that febrile persons are less susceptible to this substance than a healthy man, and also that there are very decided individual variations. Sometimes 0.25 to 0.40 grammes are sufficient to cause ringing and various noises in the ears of a healthy man (1). In other cases patients have been able to support doses of 8 grammes (Monneret), 9 grammes (Maillot) and even 12 grammes (Graconini).

The doses of quinine which caused amaurosis vary between 5 grammes in thirty hours and 78 grammes in three days (2). In my patient 6 grammes were sufficient to induce complete and persistent amaurosis. In a case of Grüning (3), poisoning occurred after administration of a gramme in thirty hours; in a case of Michel (1), 15 grammes, and also in that of E. Berger (2), 15 grammes. In the case described by Dr. de Wecker in his lectures on ocular therapeutics (3) a young man, twenty-nine years old, who wished to cure himself of intermittent fever, poured quinine into a large glass to a height of 2 centimetres then swallowed it all and went to bed. He awoke deaf and blind.

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(1) **Manquat.** *Traité de thérapeutique.*

(2) **Gowers.** *Die opthalmoskopie in den inneren medizin*, 1893.

(3) **Grüning.** (*Arch. für Augenh.*, 1882.)

The symptomatology of quinine amaurosis is now very well known. Those who formerly attributed these singular symptoms to malarial infection have been obliged gradually to change their opinion in the face of classical cases—those who have never suffered from intermittent fevers.

Experiment has also contributed much to strengthen this opinion. Barabachew (4) has induced all these ocular phenomena (retinal anæmia, contraction of the vessels, pallor of the discs, diminution in vision even to amaurosis, and concentric contraction of the visual field) in healthy subjects. He has also succeeded in finding a temporary intensification of visual acuity of several hours' duration.

Becker and Horner have brought about the same amaurosis with contraction of the vessels, in dogs, by means of hypodermic injections of hydrochlorate of quinine.

The picture of quinine-poisoning is almost always the same. The case of central scotoma, described by Iodko, is, however, an exception. A curious phenomenon, from the psychological standpoint, has been observed by Grüning. When his patient began to read, she saw the letters white on a black ground.

The auditory disturbances are always less pronounced than the disturbances of visual acuity.

Central vision is the first to return, and one should never despair, even in the most marked cases and those of long duration. The case, described by Dr. de Gouvea at the Congress of Rome this year (1) is most instructive in this respect. This concerned a farmer of Rio-de-Janeiro, who had taken 20 grammes of sulphate of quinine with suicidal intent. He became deaf and blind. Eight months later Dr. de Gouvea only found slight perception of light. The patient was given hygienic treatment (cold douches, dry rubbing, and residence in a high region) and, in addition, inhalations of nitrate of amyl and periorbital injections of strychnine. He saw him again two years afterwards and, to his great astonishment, the vision of the right eye was two-thirds, and that of the left one-quarter. The retinal vessels were still very thin, and the difference between the ophthalmoscopic examination made at such long intervals was insignificant.

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(1) **Michel.** (*Arch. für Augenh.*, 1882.)

(2) **E. Berger.** *Les maladies des yeux dans leurs rapports avec la pathologie générale*, 1892.

(3) **De Wecker.** *Thérapeutique oculaire.* Lectures compiled by Dr. Masselon, 1879.

(4) **Barabachew.** (*Arch. d'Ophtal.*, 1891.)

In quinine amblyopia the visual field for white always remains more or less contracted, and, in the majority of cases, assumes the form of an oval elongated in the horizontal direction. This contraction of the visual field persists even when the central vision has returned to the normal, and it is always concentric and regular. This regular contraction is a proof of the fact that the pallor of the discs depends upon a vaso-motor phenomenon, and not on an inflammatory process. Atrophy from neuritis gives a more or less irregular visual field.

The color sense also suffers in quinine-poisoning, and even more than the white. In Grüning's case, although central vision had regained its normal power, there was blindness for all colors. Later on the colors were perceived, but this perception remained somewhat obtuse.

In my patient, color perception was good, and I was easily able to trace the campimetric limits for blue, red, and green.

The pathogenesis of this affection has been much discussed by authors. Most of them believe that it consists of retinal anæmia from more or less considerable vaso-constriction.

According to some, the vascular phenomenon depends upon a stimulation of the vaso-motor centre, while, according to others, it is due to a local irritation of the loose fibres of the vessels. This irritation would lead to a certain amount of vasculitis, which would permanently contract the calibre of the vessels.

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(1) See *Annales d'Oculistique*, Vol. CXI., p. 363, 1894.

It will be seen that the visual disturbance results from lack of retinal nutrition dependent upon a mechanical vascular phenomenon. Where the central vessels of the retina have almost disappeared (in the equator of the eye) the sensitiveness of the retina is lost. Hence, the cause of the contraction of the visual field. If we were able to augment the retinal blood supply in our patients, the retina would be more sensitive and visual acuity would, consequently, increase (de Gouvea). The prognosis of this disease has already been given in this article. It is always more or less favorable. In amblyopia of low degree, and especially in children, recovery may be rapid and radical with complete disappearance of the ophthalmoscopic signs.

The pallor of the disc and contraction of the vessels may persist for many years after perfect return of vision. However, complete re-establishment of the visual field is exceptional, and indeed unknown in severe cases. The visual field for white is always more seriously affected.

The prognosis is contradictory to the subjective and objective symptoms. We know that absence of luminous perception is one of the gravest signs in ocular diseases, although there are exceptions, which have been published by Dr. de Wecker.

The most evident exception is certainly quinine amaurosis, in which even electrical stimulation of the optic nerve will produce no luminous phenomena in some cases (Roosa and Grüning). Recovery, however, occurs in such cases.

The objective signs also are no more encouraging. Whoever could have made an ophthalmoscopic examination of my patient without being informed of her visual acuity, would naturally have supposed that she was blind, as the discs were so pale and the arteries so thin.

Thus, even in the most extreme cases, we should not despair of the future of our patients. No cases of permanent blindness are known.

Hygienic treatment is of the greatest importance. Walks in the open air, massage, exercise, and hydrotherapeutics. In the commencement rest in the dorsal position was justified in Grüning's case. Whenever the patient assumed an erect position, and also in the menstrual periods, vision diminished perceptibly.

As medication, the most efficacious consists of periorbital injections of strychnine (de Wecker). Inhalations of nitrate of amyl have also been prescribed to increase cephalic congestion, and also arsenic, iodide of potassium, iron compounds, and continuous electric currents.

It must not be forgotten that in these patients administration of the smallest doses of quinine in injections may arouse or accentuate the amblyopic phenomenon.

OBSERVATIONS

PERSISTENCE OF THE CANAL OF CLOQUET AND POSTERIOR POLAR CATARACT COMPLICATED BY SPECIFIC CHOROIDO-RETINITIS; DEPOSITS OF PIGMENT IN THE WALLS OF THE CANAL

By Dr. **L. STEINER** (Sœrabaya, Java).

Persistence of the canal of Cloquet is not so rare as to justify the publication of all cases of this anomaly. The following case was complicated by lesions of the fundus of the eye which showed themselves in part in the lumen of the canal. This localisation seemed to me to throw some light upon certain questions in pathology and to warrant the publication of the case.

The patient is a Chinese woman, about fifty years of age. She presents evident signs of severe syphilis, among others an ulcerous communication between the nasal fossæ and a characteristic depression of the bridge of the nose. She complains of progressive trouble with vision in both eyes. With the right she can count the fingers at 50 centimetres, with the left at 2.5 metres. The visual fields of both eyes are considerably contracted. The inattention and stupidity of the patient do not permit an accurate delimitation.

Ophthalmoscopic examination as follows :

Right eye: At the posterior pole of the lens a small, circumscribed, round opacity with some fine, short, radial prolongations. The remainder of the lens of normal transparence.

The papilla is pale; the vessels few and very small in the reversed image; the veins only are visible, and they can be traced but for a distance of 1 to 2 papillary diametres from the edge of the papilla. In the erect image one can discover on the papilla a few fine arteries, the continuations of which form bifurcating white lines in the adjoining retina. In the periphery of the retina the vessels cannot be seen. The fundus of the eye is deeply pigmented. The pigment is irregularly distributed in a coarsely granular layer, intercepted by red lines (the choroidal vessels) and white lines (the obliterated retinal vessels). Here and there are seen some black spots of unequal size, some irregularly round, some roughly star-shaped, some encircled by a whitish atrophic border. They are more numerous in the central parts of the retina than in the periphery, and though sometimes discrete, more frequently are united in groups. One of these groups covers the region of the macula.

Beside these black spots, near the papilla are seen three or four small round spots of a yellowish-red color. The vitreous, of normal transparence, is traversed from behind forward by a canal, which begins at the papilla by a narrow mouth, covering from one-sixteenth, to one fourth, of its surface in the anterior parts, enlarges like the funnel of a trumpet, and ends close to the spot on the lens without its being possible to establish a direct connection with the latter. Its walls are grayish, very thin and fine, regular, and without folds. There is no vessel in the canal. But its attachment to the papilla forms a slender oval which extends from the centre of the papilla to its inferior border, and corresponds exactly to the course of the principal vein (nasal inferior), which divides below at the point where it leaves the canal. In its upper and external wall we notice a small, compact group of minute black spots, which in color, form, and arrangement reproduce exactly the black spots of the retina above described, and can be distinguished from them only by their extreme smallness. The surrounding parts of the walls show no peculiarities. The spots are simply deposited within the walls without alteration of their surroundings. In the other walls, moreover, we find no anomalies corresponding to the lesions of the fundus of the eye. They are throughout of a uniform gray. In the upright image the spots are seen distinctly with a convex lens of from 5 to 7 dioptres, while the examination of the fundus requires a concave glass of 1 dioptre.

In the left eye we find the same anomalies with some modifications, which are partly due to the fact that the inflammatory process is less advanced. At the posterior pole of the lens is an irregularly oval central spot with three long, well-marked rays—two below, one above. The rest of the lens is transparent. In its posterior part, near the papilla, the vitreous is rendered faintly turbid by fine dust-like opacities. The papilla is pale rose. The vessels are few and small, but the atrophy is less marked than in the right eye. Beside the veins one can distinctly see some fine arteries, and the vessels can be traced further into the periphery. Moreover, for a certain distance from the papilla, we can see the white lines which border the vessels and gradually disappear upon their prolongations. As on the right, the fundus is deeply pigmented, the pigment coarsely granular, and marbled with red lines. The black spots are fewer than on the right. Near the macula we see only one, and that very small. On the other hand, the small, round, yellowish spots—pin-head size—are much more numerous at the centre, as well as in the periphery. They are almost all discrete, but some are drawn together in rather compact groups. The canal of Cloquet can be seen in this eye also. It is narrower than on the right; its walls are thinner, more transparent and, hence, less easily seen. It begins by a narrow mouth at the centre of the papilla, without apparent connection with the vessels, and enlarges as it advances toward the cataractous posterior pole of the lens. There is no vessel in it. In its walls it shows two small groups of fine black spots—a superior and an inferior—the former is the more distant from the papilla. In the upright image it can be distinctly seen with a convex lens of 5 to 7 dioptres, the latter with 4 to 6 dioptres, while the fundus of the eye is slightly myopic (+ 1 D). As on the right, these spots closely resemble the black spots on the retina, and can be distinguished only by their smallness. The adjoining parts of the walls are in no way modified, and the other walls show no change suggestive of inflammatory lesion.

To sum up, we have before us a case of persistence of the canal of Cloquet, complicated by a specific choroido-retinitis, with the formation of pigmented spots in the walls of the canal. This observation will, I think, enable us to answer the question as to the origin of these spots in this affection.

It is generally admitted, and microscopic examinations seem to show, that these spots arise from cells of pigment epithelium. Our case proves that this is not so, or, at least, that this is not always their origin. For the spots which we have observed in the canal of Cloquet in the middle of the vitreous, evidently cannot come from the pigment epithelium with which they have no visible connection. What, then, is their origin? At first approach the question seems a difficult one. For finding no hyaloid vessel in the canal, it seems that we can not look to the blood for the source of the pigment, and excluding the pigment epithelium of the eye and the blood, we do not see where the pigment can come from. But if we remember that the examination of the retina shows a very evident diminution of the calibre of the vessels and even the obliteration of a great number of them, it seems to me not too much to admit that there was a persistent hyaloid artery in each eye, but that, as the result of the inflammatory changes in the retina and optic nerve, these vessels were obliterated, as were all the retinal arteries and veins of the same calibre, and that the pigment of the canal of Cloquet came from these vessels now obliterated and invisible. The fact that in the right eye the papillary extremity of the canal attaches itself closely to the course of a large vein appears to me to favor this view.

By analogy it may be inferred, I think, that in specific affections of the retina these black spots can at times be found without involvement of the pigment epithelium. The presence of these spots does not necessarily prove that the pathological process extends to this epithelium.

EPILEPSY CURED BY TENOTOMY OF THE OCULAR MUSCLES*

By Dr. **WALTER B. JOHNSON,**
Paterson, New Jersey.

J. H. H——, twenty-three years old, consulted the writer on the fifth day of September 1889, stating that he suffered from a very peculiar form of disease of the nervous system, for which he had been examined and treated, during the past two years, by a large number of prominent physicians. He was in good physical condition, attended to his business as a salesman regularly, and had been subject to no disorder, except slight headache, until the attacks for which he wished treatment came on, two years before. Since that time, at intervals varying from two weeks to two months, he had had attacks the onset of which was a violent headache coming on suddenly and without any premonition, and followed by loss of all conscious mental action. The patient had no recollection, when recovering from the attack, of anything except the initial headache. The time during which he remained in the state during which conscious mental inactivity was present varied from two to five days; during this time he would, if the attack seized him on the street, have been able to care for himself, as under such circumstances he invariably had sufficient money remaining at the end of the attack to indicate the expenditure of enough only to have paid expenses during the time which was a blank to him. On returning to conscious mental activity, he generally, upon awaking in the morning, found himself in some hotel in the city, which he had not been accustomed to frequent. If the attack seized him at home the improvement in the headache, which occurred generally in two or three hours, was followed by a profound sleep which lasted until the following day, or, in extreme cases, for two days, the headache frequently returning on the morning of the second day. When the stupor passed away he was able to resume his work, as usual.

The physicians consulted by him differed in opinion regarding the nature of the attack, most of them, including Dr. A. L. Loomis, making the diagnosis of the disease epilepsy, while others considered it only epileptiform in character.

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*Read at the Forty-sixth Annual Meeting of the American Medical Association, May, 1895.

Upon the recommendation of his physician he concluded to consult further, with a view of determining the existence of any abnormal ocular condition as an etiological factor in the production of his disorder. He applied for treatment in September, 1889. The case was of such marked interest that a consultation was considered advisable, and the several consultants, including Drs. Knapp, Stevens, and Webster, reported the details of their examinations.

The result of the examination made by myself conformed to some of the others, and was as follows :

R. V. = $\frac{20}{30}$ — : $\frac{20}{15}$w — 1 D. c. ax. 180°.
L. V. = $\frac{20}{15}$ — : $\frac{20}{15}$w — 0.75 D. sph.

With this correction the lines upon the test chart for astigmatism were all of an equal density and thickness, and the vision normal. Esophoria 5°, with homonymous diplopia at distance, a diplopia which he could at times overcome. The diplopia was not present at the near point either with or without the correcting glasses, which were ordered, and which the patient was directed to wear continuously. They were

R. — 1 D c. ax. 180°
L. — 0.75 D sph.

For some time after the glasses were prescribed and worn, the patient was decidedly improved, his general condition was much better, and he had none of the attacks previously described. Finally, the primary effect of the glasses passed away, and the epileptic seizures returned with as much frequency and force as before. The partial tenotomy of the internal recti muscles, as advised by Dr. George T. Stevens, was performed January 22, 1890.

The eyes were tested immediately after the tenotomy, and showed a slight degree of exophoria. The patient was directed to wear his glasses continuously and report. He remained in the city for two months, during which time there was no return of the attacks herein described, and although he at times suffered from headache, he had none resembling those which occurred at the onset of an epileptic seizure, nor any stupor or loss of conscious mental activity following.

April 23, 1895, in a letter written from his present home in Chicago, the patient states that he never has had any attacks of epilepsy since the last record above, and that his physical state is in every way greatly improved.

GONORRHŒA AS A CAUSE OF NEURO-RETINITIS

By Dr. **H. CAMPBELL HIGHET** (Signapore).

Ocular affections as complications or sequelæ of general septic conditions, are frequent enough. They are too well known to merit any detailed account by me. Amongst them, however, gonorrhœa is a very frequent and important example, and is the etiological factor in a special form of conjunctivitis, of iritis, and of irido-choroiditis.

Of neuro-retinitis following gonorrhœa, the records are still very few since Panas reported the first case in 1889. The example which I have now the honor of bringing to the notice of the readers of the *Annales d'Oculistique* has been closely watched by me, and the only conclusion that I can come to is that it is a case of gonorrhœal neuro-retinitis.

The notes of the case are as follows:

H. B., aged thirty, bachelor, came to me upon the 22d February last, complaining of dimness of vision in the left eye, of three weeks duration. Three weeks before the onset of the eye-symptoms, he contracted a gonorrhœa, which was followed by some swelling of the inguinal glands on both sides.

The gonorrhœa and buboes are now much better, and, in the patient's mind, have very much sunk in importance in comparison with the condition of vision, as he is an officer on board a merchant steamship.

The previous history of the patient is very good. There are no indications of syphilis, rheumatism or tuberculosis, and the family history is free from all taint. The urine contains nothing abnormal beyond the remains of the gonorrhœal discharge.

On examining the eyes, the V. Ac. in the right is found to be $\frac{20}{20}$, and in the left $\frac{20}{80}$. There is manifest hypermatropia in the right of 1 D.

The color field, especially for red and green, is very much restricted in the left, but normal in the right.

On ophthalmoscopic examination of the left, there is found a typical neuro-retinitis. The papilla is red and swollen—requiring a

+ 3 D lens to make out its details. The edges of the disc are veiled by exudation, which passes out for a distance of quite the diametre of the disc all around. The vessels are veiled completely in patches, the arteries are small, and the veins swollen and tortuous. The veiling of the macular region is very distinct. The periphery of the fundus is clear. The right eye is quite normal.

The treatment adopted was the administration of salol in doses of ten grains three times daily. A simple injection of a weak solution of permanganate of potash was prescribed. Repeated fly-blisters were applied to the left temple, atropine was instilled night and morning, and the patient was enjoined to cover the eye with a shade and to remain in a dark room as much as possible.

Three weeks later I note—there is considerable improvement to-day. The macular region is clear, and the edges of the disc are faintly outlined. The V. Ac. amounts to $\frac{20}{60}$.

A month later than the previous note—the V. Ac. amounted to $\frac{20}{30}$. The edges of the disc were seen much more clearly, and only some of the lower vessels were still slightly obscured by the exudation.

On the 10th of May, nearly three months since I saw the patient for the first time and quite three and a half months from the onset of the dimness of vision, I note—the edges of the disc are now clear, the papilla has resumed its normal appearance, all the details, including the presence of a well-marked physiological cup, are clearly made out; the retinal vessels are no where veiled, and the V. Ac. amounts to $\frac{20}{20}$. There are absolutely no signs of any tendency to atrophy, and the field for color vision has now resumed its normal dimensions.

Here, therefore, in this well-marked case of neuro-retinitis, we have none of the usual causes, such as are described in temperate climates, nor have we any peculiarly tropical diseases to account for it, as, for example, malaria or Beri-Beri, in both of which I have seen optic neuritis as a complication.

There is no trace of excess in alcohol or tobacco, and the only cause to be made out is an attack of gonorrhœa, which has acted upon the optic nerve in the same way as it may do on other nerves—the sciatic, for example, in producing a neuritis of septic origin.

II.—REPORTS OF SOCIETIES

CONGRESSES

OPHTHALMOLOGICAL SOCIETY OF THE NETHERLANDS

Eighth Session, held at The Hague, December 15, 1895.

Report of the proceedings by Dr. Westhoff.

Treatment of Ophthalmia of the New-Born.

Dr. Jitta (Amsterdam).—When only one eye is affected it has been recommended to bandage the sound eye or to protect it by some special appliance. This procedure should be rejected. I employed Crede's method with great success in ten cases : A $\frac{1}{100}$ solution of nitrate of silver was applied daily on the inverted lids of the unaffected eye. The eyes thus treated remained perfectly healthy. I treat the conjunctivæ of the new-born by Burchardt's method : the conjunctival cul-de-sacs are syringed every two hours with a warm $\frac{1}{1000}$ solution of nitrate of silver. Ice is harmful.

Dr. Straub (Amsterdam) uses, with success, Kalt's method, irrigations of permanganate of potash, which prevents corneal infection and quickly dries up the secretions.

Dr. Mulder (Groningen) has seen this method employed at Paris. He finds it too complicated.

Dr. Gunning (Amsterdam) recommends the use of nitrate of silver. He has employed it in ordinary ulcerations of the cornea.

Dr. van Kynbeck (Amsterdam) also recommends it, and he has seen recovery brought about in a short time from an obstinate ulcer of the cornea arising from unintentional instillation of a $\frac{1}{20}$ solution of nitrate of silver.

Heredity of Acquired Anomalies of the Visual Organ.

Dr. Mulder.—For ten years I have enucleated the right eye of consecutive generations of two hundred rabbits immediately after birth without the production of an hereditary anomaly. On the other hand, animals which have lost an eye by infection—for example, tuberculosis—reproduce individuals with congenital anomalies of the eye, such as polar cataract, microphthalmia and coloboma of the eye. Mutilations, then, are not transmitted by heredity, but alterations resulting from infection are transmitted. There is probably a direct action of the infectious agent on the germ plasma.

Dr. van Genderen Stort (Haarlem) recalled the fact that Brown-Sequard had sent two guinea-pigs to Donders having ocular anomalies which had been transmitted through several generations. At Utrecht these guinea-pigs had bred normal individuals. Change of surrounding and distance from the source of infection had re-established a normal condition.

A New Method of Diagnosis for Conjunctival Affections.

DR. SNELLEN (Utrecht).—A 8% solution of peroxide of hydrogen (H O) effervesces on contact with pus and lymphatic cells by disengaging oxygen. When such a solution is applied to the conjunctiva effervescence only develops in altered places.

Dr. Westhoff (Amsterdam) has employed this re-agent without practical results in cases of dacryocystitis and severe conjunctivitis after the example of dentists, who use it in dental periostitis.

A Case of Pulsating Exophthalmus.

DR. BOUVIN (The Hague).—This affection was the result of a traumatism. A knitting-needle had entered the internal angle of the eye and, passing before the optic foramen and the carotid, had penetrated the cavernous sinus. Gentle pressure on the carotid by a bandage, or with the fingers, produced marked improvement.

Dr. Mulder.—In three cases of this kind which I have observed, recovery was brought about in two by ligature of the carotid. In one case spontaneous recovery was suddenly established.

Dr. van Genderen Stort cautions against strong compression, which he has seen produce œdema of the optic nerve.

Torticolis from Paralysis of an Ocular Muscle.

DR. BLOK (Rotterdam).—I have seen a vicious position of the head assumed by a child as the result of paralysis of the superior oblique. Tenotomy of the inferior oblique led to an improvement in the position of the head.

Protecting-Spectacles for Workmen.

DR. HILLEMANS (Utrecht). — The high proportion of ocular traumatisms among certain classes of workmen, which, in stone-workers, for example, produce the loss of half the eyes, a loss which should be partly attributed to the indifference of the workmen, necessitates the use of good protecting-spectacles. M. Olland, at

Utrecht, has constructed two models of protecting-spectacles for stone-workers. One form, for the workmen in quarries, is composed entirely of metallic wire, and the other for work necessitating good vision is supplied with a glass three millimetres thick.

The Etiology of Descemetitis.

DR. H. SNELLEN.—In the ophthalmic hospital reports, October, 1895, Dr. Ridley again considers the question of descemetitis. He classifies this disease with a more extensive one, serous cyclitis, an affection which does not always produce deposits on Descemet's membrane. In a certain number of cases a plastic exudate arising from the ciliary bodies clogs the interstices of the zonule of Zinn, thus producing an increase of intraocular tension with advancement of the lens system. In other cases the ciliary exudate engorges the spaces of Fontana and thus produces an increase of tension with deep anterior chamber. Dr. Ridley claims that the masses of bacteria found by me on Descemet's membrane may be the cause of the disease, and he thinks that the infectious agent first reaches the ciliary body by the circulation. I have never doubted the fact that descemetitis may be the result of an inflammation of the deep parts of the eye, but I have found that there are cases in which the deposits on the membrane of Descemet are the only alteration.

Color Phenomena of Benham's Disc.

DR. SNELLEN.—The rotary disc of Benham is partly white and partly black, the limit being formed by the diametre, and the white portion subtending segments of the circumference 45° in extent and of different radii. When a rotary movement is given to the disc, the segments of the circumference seem to be colored. What is the explanation of this color? I have endeavored to analyse this phenomenon by tracing on a rotary disc a black circumference 60° in extent. On rotation the circumference appeared gray, with no color, but on covering half the disc with black paper, this circle appeared colored. The color changes according to the distance which separates the segment of the circumference from the limiting line of the white and of the black. An entire semi-circumference is equally colored, and identical phenomena are obtained by tracing white circumferences on a disc half black, but the colors are different.

The fact that a semi-circumference is equally colored proves that the explanation founded upon the unequal duration of secondary images of the different colors cannot be accepted. The secondary image of white is always black, except after action of intense light, which produces pathological alterations. Dispersion alone can separate the colors which compose white light, and, indeed, on the border of the segment of circumference, colors are seen suggesting the effect of a prism. Another analogy between dispersion and the phenomena produced by the Benham disc is the different color produced by black lines on a white ground on the one hand, and on the other, by white lines on a black ground, but the chromatic aberration of the eye is too slight to explain the phenomenon by dispersion. The color of the segments of the circle has the character of simultaneous contrast, and suggests the color of shadows cast upon a colored field. If the field of the disc could be considered as colored, the phenomenon might be explained by simultaneous contrast. In fact, if a slight tint is given to the white portion, we see the colors assume the complimentary color, and by substituting yellow or red gaslight for daylight illumination, the violet tints of the color phenomena are reinforced. On the other hand, the appearance of colors on an absolutely black and white disc illuminated by white daylight indicates the existence of another factor.

When the experiment is reduced to its simplest form, that is rotating a disc part white, one is struck with two facts: 1st, the disc appears branching like the markings of marble. A diaphragm placed in front of the eye enables one immediately to recognise the cause of this peculiar appearance; Purkinje's entoptic picture of the retinal vessels is perceived. The shadows of the vessels being visible, their color and, probably, also that of the retina are not without influence. In fact, on comparing the color produced by the rotation of a simple neutral gray disc, a marked difference of color is observed. In conclusion, I may say that the colored phenomena of Benham's disc may be considered as simultaneous contrasts produced on a colored field. The color of the lines changes in proportion as their retinal images coincide with a secondary image, the black portion with the white portion of the disc. The color is derived from the illumination and from the entoptic image of the retina.

Symmetrical Disturbances of Both Corneæ.

Dr. Westhoff.—I have for some time had under observation a woman, sixty-one years old, having symmetrical disturbances of both corneæ. The lesion is situated in the lower internal segment. It is about 5 millimetres in diameter in the left eye, and 4 millimetres in the right. The borders of the affected portion are well marked, except on the side toward the centre of the cornea, which is lost between the lamallæ of the corneal tissue. The external border is about 2 millimetres from the sclero-corneal limbus. The epithelium is intact.

SOCIETIES

OPHTHALMOLOGICAL SOCIETY OF PARIS

Session of December 3, 1895.

Gummas of the Iris.

DR. O. DE SPEVILLE presented a patient, twenty-six years old, who had consulted him for three small localised lesions in the iris, corresponding to the description of tubercles of the iris. Dr. de Speville performed subconjunctival injections of one division of a Pravaz syringe of a $\frac{1}{1000}$ solution of sublimate. The lesions disappeared without leaving a trace, but when the right eye had recovered, the left eye was affected with similar lesions. A small, yellowish projection formed on the iris with corresponding injection of the sclera.

The diagnosis in this particular case presented no difficulties, as the syphilitic history was very clear.

Dr. A. Terson.—This case shows the possibility of the appearance of important syphilitic complications in the second eye, when the first has recovered after local treatment, and while general treatment is still in progress. Last year I observed a patient in the service of Professor Fournier, who, as the result of a recent syphilis, had large condylomata of the iris in one eye. Four inter-muscular injections of the oil of the bi-iodide (Panas's formula) caused them to disappear completely, but two days afterwards, while the patient was still under treatment, other condylomata, no less voluminous, appeared in the other eye, and five injections were necessary to resolve them.

Dr. Parent.—In this particular case there could be no possible discussion as to the diagnosis. Such gummous lesions of the iris indicate severe syphilis, and, consequently, there is no reason for astonishment at the appearance of the lesions in the left eye during treatment. In such cases injections of calomel might be of use.

Dr. Parinaud.—Undoubtedly there are cases in which a differential diagnosis between tubercles of the iris and condylomata may present difficulties. If, however, one refers to the symptomatology which I gave fifteen years ago, there will be no difficulty in diagnosis in the majority of cases. In fact, before that time tubercles of the iris were not recognised; to-day every one diagnoses them. It is true, however, that ocular tuberculosis has many and various forms, and that between the typical cases there are those in which this diagnosis is quite difficult.

As to treatment, it should be remembered that tuberculosis, considered as a local lesion, has a natural tendency to recovery.

Dr. Darier.—Subconjunctival injections of $\frac{1}{100}$ sublimate rarely produce accident. I think that they are contra-indicated in cases of iritis with internal vascular stasis, but I have lately treated several cases of severe iritis by injecting rather into the cellular tissue of the orbit than into the conjunctiva, and have obtained good results.

Dr. de Speville.—I employed sub-conjunctival injections because I have seen them employed by Dr. Abadie with success in cases of gumma of the iris.

Session of January 7, 1896.

Corneal Curetting in the Cure of Pterygium and Fascicular Keratitis.

DR. DE WECKER.—He has obtained good results from curetting pterygium as proposed by Deschamps (*Annales d'Oculistique,* Vol. CXIV., p. 54). He is content, however, with curetting the corneal region and following this with an aseptic injection. In several cases of fascicular keratitis this form of treatment induced recovery more rapidly than by the common methods.

Dr. Jocqs.—For two years I have employed curetting in the treatment of fascicular keratitis, and have obtained very good results.

Tubercular Fungus.

DR. VALUDE.—This was a child, nineteen months old, who was brought for consultation to the Quinze-Vingts, with the following ocular lesions—moderately swollen lids, but held open by marked chemosis, and quite abundant muco-purulent secretion. The cornea was quite dull, and the iris was seen to be immovable, with complete occlusion of the pupil, and absence of anterior chamber.

Five millimetres outside of the corneal border was a gaping hole, circular, crater-form, and large enough to permit the introduction of the extremity of the little finger. This orifice was encircled by a red exhuberant fungoid border, and was filled with a yellow putrid mass, and evidently conducted into the interior of the eyeball.

The diagnosis of tubercular fungus was evident as the child was sickly, and presented no less than six spina ventosa on its ten fingers. Enucleation was performed to relieve the suffering and arrest the suppuration.

On examining the specimen, the ordinary structure of fungus was found with numerous giant cells, but no bacilli. This fact was not extraordinary considering the long standing of the lesion. The only point to be noted was very great vascularisation of the nodules which might have suggested gummas, if the diagnosis of tuberculosis had not been clear from the co-existence of many other lesions. The child died a short time afterwards of tubercular broncho-pneumonia.

Pseudo-Diphtheritic Bacillus in a Case of Dacryocystitis.

DR. FAGE.—The presence of the pseudo-diphtheritic bacillus, which only differs from the specific bacillus of Lœffler by its lack of virulence, has been noted in various conjunctival affections. I have lately observed it in a case of chronic dacryocystitis which had a short time before undergone an acute attack. Cultures on different media showed it with its classical characteristics. In addition to it, I found several non-pathogenic microbes. Inoculation of the conjunctiva of a rabbit with a pure culture of this bacillus made in serum gave no positive result, but on the pharyngeal mucus membrane of a pigeon a small false membrane was formed containing the bacillus of the culture. Subcutaneous injection of 3 c. c. of a beef-tea culture in a guinea-pig did not kill the animal. It was, therefore, not a virulent bacillus. Bacilli identical with those found in the conjunctival sac could not be found either in the nasal fossæ or in the mouth.

Certain bacteriologists deny the identity of the pseudo-diphtheritic bacillus and the true diphtheritic bacillus. But Roux and Yersin think that the difference in virulence does not imply difference of origin, and that one is only an attenuated form of the other. Under these conditions it is proper to ask whether the pseudo-diphtheritic bacillus has any influence in conjunctivitis and dacryocystitis, either by assuming virulence, or by association with other microbes. In my case the associate microbes, which were not, however, pathogenic bacteria, seem to be more numerous.

Dr. Fage repeated that in his patient he only found on gelatin and on serum non-virulent bacteria in addition to the pseudo-diphtheritic bacillus. Undoubtedly, it is impossible to define the rôle of this bacillus in such a case, but it is reasonable to suppose that it plays some part, at least if it is identified with the virulent bacillus as has been done by Roux and Yersin in their work, which is authority on this subject.

Dr. Morax.—The fact that Dr. Fage has isolated, by culture, a bacillus resembling the diphtheritic bacillus in a case of dacryocystitis does not prove that this bacillus was the pathogenic agent of the infection. There is a faulty tendency to describe under the name of pseudo-diphtheritic bacillus all the bacilli which develop on gelatinised serum by producing white colonies. It is sufficient to fertilise gelatinised serum with healthy or pathological secretion from a mucous membrane to obtain frequently large numbers of colonies formed by bacilli. But of these bacilli there are several varieties, and if, as Roux and Yersin have demonstrated, there is a diphtheritic bacillus lacking in virulence it does not follow that all the bacilli isolated on gelantinised serum enter into this class, and that these bacilli may, under influences which we do not understand, be transformed into diphtheritic bacilli pathogenic for the guinea-pig.

It would then be better to limit the designation pseudo-diphtheritic bacillus to those which have all the characteristics of the diphtheritic bacillus and only differ from it by the absence of pathogenic action on five animals.

I would also remind Dr. Fage that a culture on gelatinised serum is not sufficient to study the microbial contents of a secretion, and to draw etiological conclusions. Microscopical examination of the pus gives very important information by showing the variety of microbe which predominates. It is also necessary to cultivate this pus on different media, coagulated serum most frequently not permitting the development of other pathogenic species, such, for example, as the pneu-mococcus. The results are frequently different in cultures on coagulated serum, gelatin and gelatinised serum, so that it is necessary to employ different media if one desires to obtain practical information.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM

Session of December 12, 1895.

Paralysis of Both Internal Recti.

MR. TREACHER COLLINS has under observation a man, twenty-two years old, with simultaneous paralysis of both internal recti, of five days' duration. It was accompanied at the commencement with headache. The patient cannot converge the eyes. The pupils react normally, and vision is good. The patella reflexes are exaggerated, and the Romberg signs diminished.

Mr. Turner thinks that there is a gross lesion of the quadrigeminal tubercles, but as the symptoms are only of five days' duration, it will be necessary to await developments.

A Case of Double Recent Ptosis, with Loss of Convergence and Weakness of the Internal Recti: Recovery.

MR. WARREN N. TAY had observed a boy, seventeen years old, with double ptosis and crossed diplopia, the characteristics of the latter suggesting those of paresis of the internal recti. When he observed a near object, only one eye converged at a time. Accommodation was intact, and the pupilary reflexes normal. The vision of each eye was good. One week previously he had had a slight sore throat for two days. This was probably diphtheria, but it is doubtful. The diplopia disappeared under iron and nux vomica.

Mr. Alden Turner is surprised that there was no paralysis of accommodation in this case. He does not think that it was a true paralysis of convergence.

A Case of Paralysis of the Third Nerve, Accompanied with Migraine.

MESSRS. ORMEROD and HOLMES SPICER presented a boy, fifteen years old, who had had an attack of complete paralysis of the left third nerve, when one year old. He recovered. When he was seven years old, he had a second attack. Since then he has an attack every nine or ten months. There is atrophy of the left optic nerve, and several of the paralysed nerves have never recovered their function. The present attack is just passing away, but there is still slight ptosis, pupilary dilatation, and complete paralysis of the motor muscles of the eye inervated by the third nerve.

A Case of Embolism of the Central Artery of the Retina in an Adult.

Mr. Marcus Gunn is at present treating a girl, eighteen years old, with embolism of the central artery of the left retina. No rheumatism and no valvular lesions. She is subject to amenorrhœa, and as this accident coincided with the menstrual period, the preceding one having lapsed, there is reason to suspect a hemorrhage into the sheaths of the optic nerve. Mr. Gunn asked for the opinion of the members present on this subject.

Mr. Hartridge had observed a man, twenty-four years old, who had suddenly lost the vision of his left eye. He had neither cardiac troubles nor anæmia, and his health was perfect. On being examined two hours and a half after the accident, there was found to be swelling of the optic disc and œdema of the fundus of the eye. There was a segment of the retina which was still vascularised, probably being nourished by a retinal-ciliary vessel. No syphilis.

Mr. Bickerton had seen almost complete blindness brought about as the result of vomiting. The patient could only count fingers. There were no ophthalmoscopic lesions.

Mr. Batten had observed sudden loss of vision in an anæmic girl, twenty-two years old. The retina became pale and the macula red. The lower retinal vessels, although diminished in size, were not completely obstructed. Later, she recovered a certain amount of vision, but not in this region.

Mr. Nettleship does not think that there are sure clinical signs enabling one to distinguish embolism from thrombosis, and these from intravaginal hemorrhage.

Mr. Lang stated that in intravaginal hemorrhages the blood may penetrate to the extremities of the sheaths, and that then it is visible with the ophthalmoscope.

Mr. Drake Brockmann thinks that there was an embolism in Mr. Gunn's case, the alteration in the blood being in favor of this hypothesis.

A Case of Retrobulbar Optic Neuritis.

Mr. Holmes Spicer.—The case was one of retrobulbar optic neuritis, occurring in a man, sixty-eight years old. He had been a great smoker, but at present is not using tobacco. His vision has diminished for seven months. He has neither rheumatism, gout, syphilis, locomotor ataxia, nor disseminated chlorosis, no kidney affections, and no diabetes. The optic discs are very pale, and somewhat swollen. The visual fields present a large central scotoma for colors. In fact, the case resembles perfectly one of toxic amblyopia of nicotine origin, and yet abstinence from the poison has not brought about improvement.

Mr. Nettleship thinks that tobacco frequently causes extensive ophthalmoscopic disturbances, and especially so with old people. This case is then undoubtedly one of nicotine amblyopia.

ACADEMY OF MEDICINE

Session of December 24.

Operative Treatment of Progressive Myopia.

DR. VALUDE.—The two following cases furnish further support of the method of intervention consisting of extraction of the transparent lens:

The first case was that of a man, thirty-five years old, an attendant in the amphitheatre of the Cochin Hospital, who came to me in the latter part of 1892, to obtain a certificate of blindness in order to be admitted to the Bicetre Hospital. This man had had progressive myopia, the advance of which had been very marked for the last few years. He then had myopia greater than 25 D., and no glass improved his vision. At 50 centimetres, with or without glasses, he could scarcely count fingers. Reading was impossible, even when his face touched the paper.

The ophthalmoscope revealed only the ordinary lesions of myopia of high degree. There was a large peripapillary staphyloma in each eye, with the macular region somewhat pale, but no real atrophic lesions, and nothing abnormal in the periphery of the deep membranes. The vitreous was perfectly transparent.

As it was impossible to give this patient any optical correction whatever, I proposed operative treatment.

He consented, and I performed successively on each of his eyes: 1st: A preparatory iridectomy and discision of the lens; 2d: After five or six days evacuation of the soft lens masses; 3d: Several weeks after capsulotomy of the membrane.

These operations presented nothing out of the ordinary, and no accident occurred.

Since March, 1893, the date of the last operation, the success has been permanent. The fundus of the eye remains the same. Vision has become very satisfactory. For distance $V = \frac{1}{6}$ without glasses, and the patient prefers to dispense with them. For reading, the change is still more remarkable; at 20 or 25 centimetres he reads the smallest letters of the Snellen types *without glasses*. He is now employed as laboratory attendant in the medical clinic of the Salpetriere.

The second case was a farmer, thirty years of age, who came to me for consultation at the Quinze-Vingts, February 1, 1895. He had myopia of about 25 D. in both eyes. For several years the myopia had progressed quite rapidly, and the patient found it impossible to continue his work. He counted fingers with the right eye at 1 metre, and with the left at 60 centimetres. It was only possible for him to read by putting his nose against the paper and then inclining the head either to one side or the other. No glass improved his condition in the least.

With the ophthalmoscope it was found that the media were clear, and that there were large peripapillary staphylomata common to this type of myopia, but that the macula was free from choroidal lesions. There was, however, at this point, some pallor. Nothing abnormal in the periphery of the fundus.

As optical correction was impossible, the patient consented to operation, which was performed as with the preceding patient.

On November 27, the following results were found with appropriate glasses: For distance $V = \frac{1}{3}$ with sph. — 2.50. For reading he can readily see the letters of the Snellen test with convex spherical glasses + 3 D.

The media have remained perfectly transparent, and the peripapillary choroidal lesions have not progressed. The patient has resumed his previous occupation.

Elongation of Ocular Muscles in the Treatment of Non-Paralytic Strabismus.

DR. PANAS.—I think that in failures after tenotomies, retraction of the aponeurotic sheath of the muscle, including that of its orbital expansion, is the principal obstacle to the straightening of the eyeball. To remedy this inconvenience, I subject the deviating muscle to considerable preliminary traction, so as to lengthen the entire musculo-aponeurotic system, and then proceed to section the tendon on a level with the sclera.

The operation is performed as follows: A vertical conjunctival incision, made with scissors, lays bare the insertion of the muscle on the sclera. A large strabismus hook is introduced by a lateral buttonhole under the muscle, surrounded by its tendonous sheath so as to include the tendon and its ocular aponeurotic expansion. By lateral and antro-posterior advancements of hooks, the entire system is separated from the subjacent sclera, and then slow and continuous traction is exerted, so as to turn the eyeball to the opposite commissure without experiencing the least resistance. After that, the ordinary tenotomy is performed, and the operation is terminated by suturing the conjunctiva with catgut. After the second eye has been submitted to the same operative treatment, an occlusive bandage is applied, which is removed on the third day to give place to a simple protective bandage.

BIOLOGICAL SOCIETY

Session of December 7.

Corneal Ulcerations in Purulent Ophthalmia; Mode of Propagation of the Microbes.

DR. KALT.—Anatomical examination of central corneal ulcerations appearing in the course of purulent ophthalmia have shown that the epithelium in apparently unaffected parts is traversed by masses of microbes in the form of wedges which extend between the cells to reach nearly to the membrane of Bowmann.

A central dilatation is formed about three millimetres wide only involving the epithelium and the membrane of Bowmann.

From this observation I conclude: 1st: That the toxines of the gonococcus render the pavement epithelium vulnerable to the staphylococcus without there being an appreciable loss of substance; 2d: That in attenuated affections the microbes are propagated between the epithelium and the membrane of Bowmann. They are destroyed by the phagocytes in proportion as they reach into the parenchyma of the cornea.

ROYAL MEDICAL SOCIETY OF VIENNA

Session of December 6.

Atrophy of the Skin of the Lids.

Dr. Fuchs presented a case of atrophy of the skin of the lids. The skin was thin, supple, loose, and not pigmented. The atrophy only affected the cellular tissue and left the subjacent muscles intact. The affection had developed in infancy. It affected both eyes, but only the upper lids, and was not accompanied by any disturbance of the general health. The cause of this affection, which has been described under the name of *epiblepharosis, adipose* or *atonicptosis,* is a disturbance of innervation, or an abnormal tension of the skin resulting from frequently-repeated attacks of œdema.

Dr Kaposi stated that the alterations which exist in this case are identical with those of idiopathic progressive atrophy of the skin. The origin of this affection should be looked for in a vascular alteration resulting from the œdema.

III.—REVIEWS OF OPHTHALMOLOGICAL JOURNALS

Beitraege zur Augenheilkunde

Reviewed by Dr. Van den Bergh.

No. XVII.

The Diagnostic Value of Functional Visual Examination

by Wolffberg.

(A detailed review of this important memoir will appear separately).

No. XVIII.

I.—Has the Area of Test Letters an Influence of the Measurement of Visual Acuity? By Dr. Settler.

Two methods are prevalent in science for denoting the measurement of visual acuity; that of Vierordt, who adopts the formula $\frac{1}{n_2}$, and that of Donders expressed by the formula $\frac{1}{n}$, n representing the linear dimension of the test letter. $V = \frac{1}{2}$ and $\frac{1}{4}$, according to Donders, would be written, according to Vierordt, $\frac{1}{4}$ and $\frac{1}{16}$.

Vierordt starts from the principle that the image of a letter of double or quadruple size will make an impression on the retina on a surface four or sixteen times larger. It is not then by the linear value of the retinal arc which subtends the smallest visual angle, but by the square of this value that V. should be expressed.

Nevertheless the linear notation of Donders has been generally accepted. In 1891, Guillery returned to the method of Vierordt. He chose as test objects, not letters, but black discs on a white ground. The acuity, according to Guillery, will be in direct proportion to the distance at which the discs cease to be perceived. But it is evident that Guillery, who does not trouble himself farther with the form of objects, confounds visual acuity with the luminous sense. His method of examination should be rejected. But is the same true of the method of notation suggested by Vierordt? Here the author quotes from Steiger, who, in an important memoir published recently in the *Beitræge,* defends Vierordt's opinion, and, at the same time, rocognises the value of Donders's theory.

In the course of his discussion, Steiger puts a question, the solution of which would settle the debate. He asks whether the entire area of two objects of equal linear size, an area which gives the measure of retinal stimulation, is able to influence visual acuity.

Let us take a square of de Wecker's scale, which is distinguished at a given distance. The question is as follows: If the size of the square increase in width, so as to produce for the same linear dimension a larger amount of black on a white ground, is the form of the square distinguished at a greater distance? In other words, does an increase in the total area produce an increase in acuity?

This is the question which the author has investigated. Only in 9 subjects out of 20 were squares of gradually enlarged area seen very little farther away than the standard square.

From this circumstance and as the result of his investigation, the author concludes that the notation of Vierordt-Guillery, based on an increase (surface area) of retinal stimulation and, consequently, on the square of the image cannot be maintained, and that the Donders-Snellen notation should be retained without restriction, as it has the further advantage of being authorized by use.

II.—Vesicular Swellings on the Anterior Capsule of the Lens, by Dr. SACHSALBER.

III.—The Operative Treatment of Myopia, and Remar on Cataract Operations, by Dr. Vossius.

Nine cases. The author operated by discision. The follow table gives the results of the operations :

Case.	Age.	Refraction. Before.	Refraction. After.	Visual Acuity. Before.	Visual Acuity. Af
1.	23.	— 18 D.	+ 3.5 D.	0.2	0.
2.	15.	— 11 D.	+ 2 D.	<0.16	0.
3–4.	21.	O. D.— 23 D.	— 1 D.	0.1	>0.
		O. S.— 23 D.		<0.1	0.
5.	20.	— 30 D.	— 1.5 D.	0.2	0.
6.	7.	— 10 D.	+ 7 D.	<0.16	0.
7.	15½.	— 16 D.	+ 2 D.	0.2	0.
8.	18.	— 18 D.	+ 3 D.	0.1	0.
9.	20.	— 10 D.	+ 5 D.	<0.1	.0

Passing to the operating for senile cataract, the author discus the advantages and disadvantages of preservation of the iris. has finally adopted simple extraction with incision in the limbus a a conjunctival flap.

IV.—On the Isolated Lesions of the Capsule of the Le
By Dr. Liebrecht.

Recovery of a case of extensive tearing of the lens capsule with the lens becoming cataractous.

V.—A Fatal Case of Basedow's Disease, by Dr. Vossius.

No. XIX.

Congenital Anomalies of Movements of the Eyes,
by Dr. Kunn.

A very complete memoir on this subject. An analytical review 68 cases published in medical literature, and a detailed descripti of 5 cases observed by the author. Anatomical, pathological, a physiological considerations.

No. XX.

A New Method of Treating Detachment of the Retina,
by Dr. Deutschmann.

Deutschmann bases his operative method on the theory of Lel and Nordenson, in which, retraction of the vitreous is considered the cause of the detachment.

He introduces a narrow double-edged knife as near the periph as possible through the sclera, the choroid, and the retina. Then, directing it obliquely across the vitreous, he traverses the pocket of the detached portion of the retina from side to side. When the point of the knife touches the sclera on the opposite side, he withdraws it, giving it several careful lateral cutting movements. His object is :

To evacuate the sub-retinal extravasation ;

To section the detached retina twice at least ;

To destroy the adhesions with the retractive vitreous ;

To give issue to the pre-retinal fluid situated between the vitreous and the retina.

Finally, and this is especially the original part of the method, he replaces the pre-retinal fluid with the vitreous of a rabbit, injected with Prevaz's syringe. Deutschmann has obtained several recoveries by this method.

No. XXI.

I.—Contribution to the Study of Glandular Formations Around the Optic Disc, by Dr. SACHSALBER.

II.—Contribution to the Study of Congenital Anomalies of the Movements of the Eyes, by Dr. KUNN.

III.—Several Cases of Amblyopia During the Period of Lactation, by Dr. HEINZEL.

Three cases of optic neuritis occurring in the course of lactation. As a general rule optic neuritis should not be attributed solely to lactation unless one can definitely eradicate the idea of syphilis, nephritis, or medicinal poisoning (lead, quinine, etc.).

IV.—Contribution to the Pathogenesis of Iritis, by Dr. AHLSTROM.

Revue Generale D'Ophthalmologie

Reviewed by Dr. VALUDE.

March.

A Case of Exophthalmic Goitre. by Dr. AUGIERAS.

This was a case in which cauterisation of the hypertrophied nasal mucous membrane led to an improvement in the symptoms of goitre, insomnia, and tachycardia.

July.

I.—**The Role of Astigmatism in the Genesis of Cataract,** by Dr. Roure.

The author publishes statistical tables, from which will be seen that in 80% of the cases when the two eyes are unequally astigmatic, the more astigmatic eye is the first to be attacked with cataract.

Nevertheless, as astigmatism is not very frequent with cataractous individuals, it cannot be really regarded as a cause of cataract, but only as a condition favoring this morbid process.

II.—**Penetration of Small Shot into the Eye,** by Dr. Ovio

(See *Annales d'Oculistique,* Vol. CXIV. p. 303).

September.

Suppurative Iridochoiroditis, with Recovery and Complete Restitution of Visual Acuity, by Dr. H. Coppez.

This was a case of iridochoroiditis with purulent infiltration of the iris and of the vitreous, which was treated by subjunctival injections of sublimate, mercurial inunctions, and subcutaneous injections of pilocarpine.

Under this treatment the vitreous again became transparent and the pupilary obstruction disappeared. Vision, which had been reduced to simple luminous perception, gradually regained its normal condition. The cause of this iridochoroiditis is obscure, for there was no visible external lesion. The author thinks that it may have been an endogenous affection of urethral origin. Large subconjunctival injections of sublimate seemed to have the best influence.

October.

I.—**Pseudo-Malignant Tumors of the Orbit,** by Dr. Panas.

(See *Annales d'Oculistique,* Vol. CXIV., p. 239).

II.—**The Operation Called Internal Sclerotomy,**

by Dr. de Vincentiis.

(See *Annales d'Oculistique,* Vol. CXIV., p. 298.)

November.

Modification of Fick's Ophthalmotonometre, by Dr. Ostwalt

(See *Annales d'Oculistique,* Vol. CXIII., p. 358).

December.

A Case of Pseudo-Membranous Ophthalmia with Pure Streptococci; Failure of Anti-Diphtheritic Serum, by Dr. H. Coppez.

This was a case of pseudo-membranous ophthalmia in a child, three years old, in which there was rapid purulent disintegration of the corneæ, and no improvement from injection of serum. The general condition of the patient was such as to have a bad influence on the local condition, as the child died in three days, of bronchopneumonia.

The ocular false membranes contained pure streptococci in great abundance and extremely virulent. They were also found in all the viscera.

This case demonstrates the existence of a pseudo-membranous ophthalmia caused by streptococci, having an especially grave prognosis for the corneæ.

IV.—BOOK NOTICES

BOOKS AND THESES

Technique de l'exploration Oculaire: Introduction á l'étude d'Ophtalmologie, by Dr. L. Vignes (419 pp. and 213 illus., *Paris, A. Maloine*, Ed., 1896).

On seeing the daily increase in number of treatises and manuals of ophthalmology appearing in every language, and distinguished only by the color of the binding, and the names of the authors rather than by their contents, one is frequently forced to ask whether this is not a useless waste of ink. This is certainly not the case with the book which Dr. Vignes has added to ophthalmological literature. It is conceived on a plan quite different from that of books of this class, and will be of great service. The introduction to the study of ophthalmology does not pretend to teach diseases of the eyes, but it presents in a clear and concise form all that it is necessary to know to learn ophthalmology from direct observation of patients, the only proper school of clinical medicine.

The first part contains the complete anatomy of the visual organ. The regions discussed extend from the lid to the cuneus. It is most excellent in the description of the embryology of the eyeball and its accessory parts. The portion devoted to the general and the special physiology of the eye is most valuable. The chapters devoted to physical and physiological optics contain all that is important for the clinician without useless developments. The same might be said of the descriptions of anomalies of refraction.—S.

Experimental Parenchymatous Keratitis,

by EMIL BAERRI (*Bâle Thesis*, 1895).

By properly treating the endothelium of the cornea, disturbances may be produced in the membrane identical in their anatomical characteristics with those observed in parenchymatous keratitis. For this purpose the author has employed curetting of the endothelium, injection of a solution of sublimate and chlorine water into the anterior chamber, and the introduction of small pieces of glass into that stand. He concludes that spontaneous interstitial keratitis originates in a primary lesion of the endothelium, as it is identical both in its progress and also in its anatomical characteristics with corneal disturbances inducted by endothelium lesions.—S.

Micropsia, by Dr. REDDINGHAUS (*Report of the Utrecht Ophthalmological Hospital*).

Micropsia resulting from paresis of accommodation has long been known, but the interpretations given of it are quite different. Donders (1850) compares this phenomenon with micropsia produced by concaved glasses on emmetropes, and explains it by the alteration in one of the elements—the accommodative effort—which interferes with the unconscious judgment necessary to give an idea of the absolute size of the object seen. This explanation readily accounts for the fact that micropsia is more pronounced for near than for distant objects. Purkinje's explanation, which supposes a partial paralysis of the retina, is less plausible. Warlomont's theory, which claims a dynamic action of the belladonna, capable of modifying the perceptions of the nervous system so as to make objects presented to it appear smaller than they are in reality, is rather an indefinite statement of the fact than an explanation, and suggests the "virtus dormitiva" of opium in the imaginary invalid.

Javal thinks that there is a diminution in the size of the retinal image by backward displacement of the lens associated with paralysis of accommodation. The micropsia would then not depend on an unconscious psychical judgment, but simply on a change occurring in the optical system of the eye submitted to the action of atropine. Professor Snellen suggested to the author an ingenious idea to decide the question whether micropsia was or was not accompanied by a modification in the optical system. If the diminution in the size of objects seen with an atropinised eye depends upon a displacement of the lens, the projection of the spot of Mariott for this eye should be more extensive than with the other eye. A series of observations have shown that this is not the case. In his experiment, Dr. Reddinghaus finds that the determination of the distance from the point of fixation to the spot of Mariott requires greater exactness than fixing the blind spot. A series of measurements of this distance before and after application of atropine have given very conclusive results. The projection of the distance from the point of fixation to the blind spot was not influenced by atropinisation.

By mental comparison of objects seen alternately with one eye not atropinised and with its mate atropinised, or supplied with a 6-dioptre concave glass, the author concludes that the apparent dimension of objects seen in micropsia is only one-half that perceived under normal conditions. Calculation shows that the diminution of the retinal image produced by a 6-dioptre concave glass does not exceed one-sixth. Micropsia resulting from the use of mydriatics does not then depend upon a diminution in the size of the retinal images, and in micropsia produced by concave glasses this element only enters to a very slight extent. Micropsia is the result of a false projection, projection of the object seen at too short a distance. This error of projection depends upon an excess in the effort of accommodation necessary in the two cases.—S.

Eyesight and School-Life, by Simeon Snell, F. R. C. S. (70 pp., with numerous illus. *John Wright & Co.*, Bristol, 1895).

This little work very properly urges the importance of more care in the appointments of school-rooms, and shows how, by simple precautions, much of the myopia acquired in early childhood may be avoided. The rooms should have plenty of light, so arranged as to fall over the left shoulder; every child should have a desk proportioned to his or her size, provided with a head-rest, to prevent the bending forward of the head, and a seat with a support for the lower part of the back; vertical writing is recommended in order to maintain the upright posture of the body; and, finally, every teacher should be provided with a set of Snellen's test types and be required to make annual tests of each child for defects of vision. When the vision is less than $\frac{6}{18}$ the parents should be notified and proper glasses should be prescribed by an oculist.

This is an attractive, well-written volume with many photographs illustrating correct and faulty methods, and will be useful to those interested in the prevention of eye defects.—BOYER.

Lessons in Ophthalmoscopy, Given by Professor Schweigger, published by Dr. GREEF (171 pp., 41 illus. *Wiesbaden*, Bragmann, 1895).

This book, which is very useful for those desiring to learn to use the ophthalmoscope intelligently, deals in its first part with the fundamental laws of geometrical optics. The second part contains the ideas of physiological optics bearing upon ophthalmoscopy. The following five chapters treat of the ophthalmoscope and its use, and the last three chapters give an abridged description of diseases of the choroid, the retina and the optic nerve.—S.

Diagrams for the Description of Ophthalmological Diseases, by Dr. O. LANGE (*Herald Bruhn*, Brunswick, 1895).

A portfolio containing a series of diagrams representing ophthalmological observations. Diagrams of the fundus of the eye; diagrams in squares for the details of the opthalmoscopic lesions; diagrams of the external appearance of the eyeball for lesions of the cornea, and, finally, diagrams representing an antero-posterior section of the eyeball for showing the anatomical lesions of the internal media.—V.

MEDICAL JOURNALS

Retinitis in Hereditary Syphilis, by Dr. HIRSCHBERG (*Deutsche medicin Wochenschrift*, June 27, 1895).

Dr. Hirschberg describes six cases of hereditary syphilitic retinitis in which the origin of the retinal infection was investigated. This occurred between the fifth and the eighteenth month, and, with the exception of the six cases, between the fifth and eighth month. It is then an affection occurring in the great majority of cases during the first year of life. Three of the patients also had iritis with slight inflammatory reaction.

In the commencement of the affection there is seen with the ophthalmoscope a disturbance of the disc and the surrounding parts of the retina and rarely retinal hemorrhages. A short time after the fundus of the eye is covered with bright yellow spots which may later contain pigment. The centre of the retina becomes gray, and the periphery is studded with yellow or dark spots.

In more advanced cases, especially those which are discovered by chance in children who desire to improve their insufficient vision with spectacles, in order to continue their school-work, disturbances of the vitreous, degeneration of the retina, detachment of the retina, and sclerosis of the optic nerve, are found.

Dr. Hirschberg estimates that in each one thousand of his patients, he found one presenting the symptons of hereditary syphilitic retinitis. Interstitial keratitis is six times more frequent. Thus, seven in every thousand ocular affections observed in Berlin are due to hereditary syphilis.

In the way of treatment the author uses, exclusively, inunctions of mercurial oiniment, which have given generally satisfactory and, sometimes, surprising results. The treatment should be continued for years. Prolonged observations of the patients is necessary, as isolated hereditary syphilitic retinitis is subject to relapses, while the retinitis, which accompanies most of the cases of diffuse keratitis, may give rise to pigment degeneration of the retina, which progresses for years after complete recovery of the corneal affection.—S.

Dislocation of the Lens into the Anterior Chamber, by

Dr. Georges Martin (*Journal de médecine de Bordeaux*, June 9, 1895)

The interesting point in this case is that the dislocation took place without the influence of an injury.

As the result of a grievous disappointment, the patient, a woman, fifty-eight years old, who had always enjoyed good health, and had never had trouble with her eyes, experienced severe pain in the right eye and corresponding side of the head, preventing sleep for fifteen days. The neuralgia, which had commenced in the middle of February, 1895, lasted until April, when she came for consultation. A diagnosis was made of dislocation of the lens into the anterior chamber leading to secondary glaucoma.

As to treatment the author thinks that it will be necessary to extract the dislocated lens by making an opening into the eyeball. The operation should be performed under chloroform, and eserine should be instilled several times to firmly contract the pupil, so as to prevent an abundant loss of vitreous.—De B.

Investigation of the Connections Existing Between the Nuclei of the Motor Nerves of the Eyeball on the One Hand, and the Posterior Longitudinal Bundle on the Other, by Dr. MAHAIN (*The Scalpel*, June 16, 1895).

Dr. Mahain describes the results of experiments relating to the study of the lesions of nutrition produced in the posterior longitudinal bundle by extirpation of the motor nerves of the eyeball.

The two experiments of Dr. Mahain have given concordant results. They establish the fact that extirpation of the third and fourth nerves is followed by total disappearance of a certain number of fibres in the posterior longitudinal bundle by arrest of development.—DASTOT.

Persistence of the Hyaloid Artery, by Dr. LOPEZ (*Revista de Ciencias Medicas* Havane, Nov. 9, 1895).

This was observed in a woman, fifty-four years old, with myopia of 2 dioptres.

The papillary insertion of a hyaloid artery corresponded with the lower temporal artery and the anterior extremity floated slightly in the vitreous.

The lens was perfectly transparent and all the parts of the eye were sound and vision normal.—DE B.

Injuries of the Orbit from Penetration of Foreign Bodies, by Dr. DE NOBELE (*Bulletin de la Société de Médecine de Gand*, August, 1895).

At the Medico-Legal Institute of Ghent the author has observed several interesting cases of penetration of foreign bodies into the orbit.

He has made a series of measurements of a large number of crania to discover the depth to which a foreign body had penetrated into the orbit. He found the following distances: From the internal angle to the optic foramen, 45.6 millimetres, and from the external angle to the optic foramen, 49 millimetres. De Wecker gives for the same distances, 40 and 43 millimetres, respectively, and Zander and Geissler, 47 and 49 millimetres. Dr. De Nobele's measurements are then about the average between those of the authors named.

From the point of view of the gravity of a lesion produced by a foreign body, he distinguishes between cases in which the foreign body only penetrated into the orbital cavity, and those in which it reaches the cranial cavity either by passing through one of the openings of the orbit, or by traversing the bones entering into its formation.—D.

Two Cases of Primary Epithelioma of the Conjunctiva,
by Dr. PHILIPPEN (*La Clinique*, Nov. 15, 1895).

Case I.—D——, a boatman, sixty years old, came to the ophthalmological clinic, at Brussels, February 15, 1895, with an epithelioma, the size of a pea on the external portion of the sclero-corneal limbus of the left eye. A pre-oricular and submaxillary ganglion were perceptible on palpation. No hereditary history. Vision normal in both eyes. The tumor was removed with a bistoury. A dressing of violet pyoctanine was applied, and in ten days cicatrization was complete. Histological examination showed that it was a lobulated pavement epithelioma. The patient was not seen again.

Case II.—November 27, 1894, a woman, fifty-five years old, came to the clinic with a large ulceration in the left orbital region. It had commenced six years ago as the result of an injury. Vision had been lost for two months, and there was severe ocular pain.

This was found to be an ulcerated cancer which had originated from the external portion of the free border of the lower lid at the point where the conjunctival mucous membrane is continuous with the skin.

Enucleation was performed, violet pyoctanine dressing applied, and December 15, the patient left the hospital free from her neoplasm.

This was in some parts a lobulated pavement epithelioma, but in others the tumor had all the characteristics of embryonic sarcoma and, finally, in the external part of the section the epithelial proliferation assumed the tubular form.—DE B.

A Case of Exophthalmic Goitre with Monocular Symptoms and Unilateral Thyroid Hypertrophy, by Dr. FRIDENBERG (*Medical Record*, July 13, 1895).

The patient was a woman, twenty-four years of age, whose parents were in perfect health. Six sisters and four brothers, all robust and well, are subject to nervous excitement. Three years ago she aborted at the fourth month and has not been pregnant since. From the time of her marriage she has been constantly worried and excited by domestic infelicity, and about six months ago her condition was aggravated by a particularly unpleasant occurrence. Her nervous excitably increased markedly with the additional symptom of palpation and dyspnœa. She noticed that she looked strange and that one eye was larger than the other.

On examination the globe was distinctly prominent, and Græfe's symptom was readily elicited. The vision was normal in both eyes and the refraction emmetropic. There was an insufficiency of the internal recti of 2° and 5°, respectively, for distance and near vision. Ophthalmoscopic examination showed venous pulsation on the disc of the left eye, but arterial pulsation could not be detected. The right shows no abnormality. The thyroid was not noticeably enlarged, but on palpation an increase in size of the right lobe and of the isthmus was made out. There was a fine tremor of the tongue and hand almost fibrillary in character (5 to 6 to the second). The heart was overacting and tumultous, at times intermittent; the second pulmonic sound accentuated. The area of cardiac dullness was increased to the left. There was marked capillary pulsation on the breast and neck. A loud, venous hum was heard over the jugular vein coincident with the first sound of the heart. The lungs were normal, there was marked pulsation of the carotids, and the radial pulse averaged 120 to the minute.

Rest in bed was advised, and ice bags over the heart and neck. Tincture of digitalis and a tonic containing iron, strychnine and quinine, internally. The heart's action was not improved by the digitalis, and so tincture of strophanthus with bromide of sodium was prescribed. After six months, the cardiac symptoms and the exophthalmus were somewhat improved, and the general health was also better.—De B.

A Knife-Needle for Discision of the Capsule after Cataract Extraction, by Dr. Weeks (*Medical Record*, September 28, 1895).

This new needle possesses the following advantages over the straight knife-needle: 1: The incision through the capsule can be made with more ease and certainty. 2: The traction of the ciliary pocesses through the medium of the capsule is less. 3: It can be manipulated more easily when the blade is in the anterior chamber. 4: The point of the knife need not enter so deeply into the vitreous humor.—De B.

The Problem of Corneal Transplantation, by Dr. Eugene Fick (*Corresp. Bl. f. Schweiz. Aerzte*, August 1, 1895).

After a description of the old and recent attempts at keratoplasty and the possible causes of failure which is the rule, Dr. Fick confirms the result of Neelsen and Angelucci relative to the new formation of an opaque tissue on the lower surface of the graft, from his successful graft experiments of corneæ of new-born cats, on rabbits. In addition to an irregular hyperplasia of the epithelium, he finds that the substance proper of the grafted flap is greatly altered. In the midst of irregularly formed fibrillæ are innumerable corpuscles, leucocytes with one or more nuclei, pigmented myeloplacques, cells, and blood-vessels. Descemet's membrane and its epithelium are completely lacking, and are replaced by a layer of new formation, which attaches the graft to the iris. Everything goes to indicate that the portion of grafted corneal tissue is a diseased tissue, and that diapedesis and vascularisation invariably disturb it. Dr. Fick asks whether it would not be better to try further grafts with a corneal tissue less advanced in its organisation, and more modest in its nutritive demands, such as the cornea of an embryo. His investigations, like those of Schœbl, have shown that the pre-corneal vascular network described by authors does not exist in the embryo of the rabbit, and that the corneal tissue becomes transparent as soon as it acquires consistency. Experiments should be tried on a large scale, and systematically with the corneaæ of embryos of the large mammifera (goats and sheep) taken at different periods of development, and the graft experiment controlled by histological investigations. But such researches would necessitate capital, proper buildings, various forms of apparatus, and, in brief, conditions which could only be realised in a veterinary school. Dr. Fick proposes that in view of the practical importance of the question, the public authorities and scientific societies should take the matter in hand for a complete study.—G. HALTENHOFF.

Unilateral Abolition of Emotional Lachrymation from Paralysis of the Seventh Nerve, by Dr. FRANCKE (*Deutsche medicin. Wochenschrift*, August 15, 1895).

Cases showing that paralysis of the facial nerve abolishes emotional secretion of tears on the same side are of daily occurrence. It is probable that the secretory fibres in question leave the brain with the seventh nerve and are separated from this nerve at the geniculate ganglion and then reach the spheno-palatine ganglion (*nervus petrosus superficialis major*). Then passing from the tnink of the seventh nerve in a ramification of the trigimenal *nervus subcutanious malae*), the secretory fibres pass with this to the lachrymal gland.

Dr. Francke was as follows: A complete paralysis of the left facial nerve, with total loss of hearing on that side occurred after an interval of eight days, during which the patient complained of headache on the left side and noises and rumbling in the ears. The sensitiveness of the head was not affected, but the facial paralysis was complete. The patient could be readily made to weep, and it was then seen that the left eye remained dry.

Abolition of lachrymal secretion by a facial paralysis enables one to localise the lesion. It should be situated in front of the branching off of the great superficial petrosal nerve, that is to say, in the geniculate ganglion, or in the part of the facial included between this ganglion and its origin. A more peripheral paralysis of the seventh nerve has no influence on lachrymal secretion.

Elongations of the facial have made it possible to observe that mechanical irritation of the trunk of this nerve produces very abundant temporary lachrymal secretion on the side operated upon. Extirpations of the Gasserian ganglion on the other hand have no marked influence on lachrymal secretion.—S.

An Epidemic of Hemeralopic Xerosis, by Dr. DUJARDIN (*Journ. des sc. méd. de Lille*, August 20, 1895).

Since the celebrated epidemic of 1863, observed by Dr. Bitot at the Foundling Hospital at Bordeaux, no epidemics of hemeralopic xerosis have occurred in France.

In January, 1895, a child was brought to Dr. Dujardin from the orphan asylum of Dom Bosco at Lille, with postular conjunctivitis in the left eye, and two brilliant white placques of nacreous appearance on a reddish ground.

A short time after this, several children were brought to him from the asylum, presenting on the external portion of the cornea, a little below the equator of the eye, a small, white placque, similar to that found in the first child.

Most of these children were free from external ophthalmia. A few had postular conjunctivitis with the common characteristics.

A careful investigation of the asylum showed that many of the children had a white spot in the external angle of the eye. Several scales were found in only two or three cases on the internal side of the cornea, but no genuine placques.

On inquiry, it was learned that one year before an epidemic of hemeralopia had appeared in the orphan asylum. This night-blindness had lasted several months and had disappeared of itself without special treatment. The patients now suffering from xerosis had all been afflicted with hemeralopia, but for several months there had been no visual disturbance. Now the hemeralopia has reappeared, as in 1894, with the same epidemic character, affecting a much greater number of children than in the previous year.

Antiseptic lotions with applications of yellow ointment were prescribed for external use, and internally, cod liver oil and preparations of quinquina, a substantial diet and frequent exercise.

The therapeutic result was *nil*, hence it may be supposed that in such epidemics it is necessary to carefully separate the contaminated children from the healthy ones. The cases of concomitant keratitis recovered without complication.

As this xerosis was purely epithelial and conjuctival, the recovery is only a question of time, and the xerosis disappears gradually with the hemeralopia, as stated already by Bitot.—DE B.

Sympathetic or Migratory Ophthalmia and its Parophylaxis, by Dr. I. PFISTER (*Corresp. Bl. f. Schw. Aerzte*, Sept. 1, 1895, p. 529 to 542).

A study of the present condition of this question, and the controversy between the different theories has led Dr. Pfister, from clinical, anatomical and experimental facts to support, with Schirmer, the theory of Deutschmann, in spite of the many obscure points. We do not yet know the microbe of migratory ophthalmia. Its development seems to be prevented by abundant production of pus (rarity of the affection from panophthalmitis). It seems to find the most favorable conditions for development in the anterior parts of the uveal tract. In any case, sympathetic ophthalmia presents the essential characteristics of an infectious process, and its primordial condition is an infection of the sympathising eye.

As preventive treatment, the author is strongly in favor of enucleation performed as soon as possible. He recalls cases of sympathetic ophthalmia observed several months after neurectomy (Trousseau and Schmidt-Rimpler), and after exenteration of the eyeball (Waldispuhl, *Bâle Thesis.*) Enucleation performed with careful antisepsis is the surest way of disembarrassing the patient of an eye in course of panophthalmitis. In support of this opinion, Dr. Pfister cites five cases from his practice and numerous cases from that of his preceptor, Professor Haab, which had no evil results. He recommends frequent antiseptic irrigations of the Tenonion cavity in these cases during the days following the operation to facilitate permanent flow of the secretions by drainage, and inclination of the head to the opposite side. In a case of chemosis and excessive exorbitism he injected a solution of sublimate and cocaine into the interior of the eyeball two or three times a day for a week. The swelling diminished from day to day, and enucleation was performed without great difficulty.—G. H.

Gallicine and Its Use in Ophthalmology, by Dr. C. Mellinger (*Corresp. Bl. f. Schweiz, Aertze*, April 15, 1895).

Methylic ether of gallic acid or gallicine, has been experimented with for more than a year at the clinic of Professor Schiess, on more than 200 cases, in the form of a powder introduced into the eye in the same way as calomel. This new product acts very favorably in cases of palpebral eczema, secreting and follicular catarrh, and especially in phlyctenular conjunctivitis and keratitis, as well as in other forms of superficial keratitis. The author recommends it highly for further trial. For the patient's use it is well to prescribe 1 gramme of gallicine, considering its low specific weight.—G. H.

Epithelial Placques on the Conjunctiva, by Dr. Pergens (*La Presse méd. Belge*, January 12, 1896).

The patient was a man, thirty-one years old, in good health, who nine years after an injury which had caused marked corneal lesions, presented the following alterations:

The cornea was transparent except in the lower internal quadrant where there were three small visible spots on the border. The two upper ones were not one millimetre square in area. The third only was in direct continuation with the principal part which extended along the limbus on the bulbar conjunctiva. This latter spot was about 1 centimetre long, and varied from 0.5 to 2 millimetres in width.

The color of the spots was creamy white and they were slightly prominent on the surrounding parts. The surface was somewhat granular, but not lax. The portion situated on the conjunctiva was movable with it, but the corneal parts were immovable.

A portion of the spot was removed with a spatula and examined under the microscope. The conjunctiva bled when it was removed. With sufficient magnification it was possible to find dry and shrivelled epithelial cells, quite irregular, and arranged in superimposed layers. This mass of cells contained bacilli having a spore in the centre similar to those described by Kuschbert and Neisser in xerosis, but which are also found in the healthy conjunctiva.

An interesting factor in this case was the sclerosis of the subconjunctival tissue. In the well-marked portions the alterations in the epithelium extended deeply, and even reached the sclerosed parts which, in turn, had undergone degeneration and dessication. The vessels in the sclerosed parts were surrounded by a thick, fibrous sheath and some were compromised even to complete occlusion.

Observations of this kind are very rare, and but few are recorded in scientific literature. Lagrange classes these cases with epitheliomas of the conjunctiva, but the author does not agree with this opinion, as this is, strictly speaking, not a neoplasm, but an abnormal proliferation of the epithelium or, rather, a lack of desquamation. This case can not be likened to those observed by Bitot in the epidemic of xerosis which he described. Here there were no general disturbances, no anæmia and no hepatic affection, which are the primary causes of the development of xerosis. The spots observed by Bitot have been named *Bitot's spots*, but this name is not suitable to this case, as there was only a local process without appreciable cause, and amenable to extirpation.—V.

Operative Treatment of Progressive Myopia of High Degree by Removal of the Lens, by Dr. DUBARRY (*Normandie médicale*, Nov. 21, 1895).

This operation has been successfully performed by the writer in two cases. The first patient was a farmer, twenty-eight years old, whose myopia had constantly increased, and who could not find glasses strong enough to give him sufficient vision. With a 24 D concave glass the vision of each eye was $\frac{1}{8}$. Furthermore the ophthalmoscope revealed a marked posterior staphyloma, and numerous traces of myopic choroiditis.

The right eye was operated upon by discision. Four days afterwards the cortical masses were evacuated, and a second and last evacuation was performed ten days later. Two weeks afterwards vision had increased to $\frac{1}{3}$ with a 2 D concave glass. With + 3 D the patient could read No. 3 of de Wecker's tests.

The second case was a woman, twenty-six years old, with a myopia of 22 D in the right eye, and 25 D in the left eye. On ophthalmoscopic examination there was found in the left eye an extensive median staphyloma with here and there some white patches of atrophic choroid. There was more clearly defined retinitis in the right eye.

This unfortunate woman was unable to earn a livlihood, and the worst eye was operated upon. Three evacuations were necessary to clear the pupil. Since then her vision has become clear and sharp. Vision equals $\frac{1}{2}$ with a 1.50 D concave glass, and with + 4 D the patient reads No. 2 of de Wecker's tests. She sees sufficiently well without glasses to perform her duties as a domestic.

In conclusion, Dr. Dubarry thinks that this operation should be reserved for cases of myopia of high degree, where the persons so affected cannot perform their duties without pain and fatigue. All eyes having a myopia more than 16 or 18 D may be considered as being excessively myopic. He also thinks that the lens should be removed whenever myopia is met with which increases from day to day, and which by its progress threatens soon to cause blindness. Dr. Dubarry is content to operate upon one eye leaving the other as a witness.—V.

V.—MISCELLANY

ITEMS

Dr. Straub has been made Professor of Ophthalmology of the Faculty of Medicine of Amsterdam.

Dr. C. Hess has been made Professor of Ophthalmology of the Leipzig Faculty of Medicine.

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I.—ORIGINAL CONTRIBUTIONS

MEMOIRS

THE DIAGNOSTIC VALUE OF FUNCTIONAL EXAMINATIONS OF THE EYE

By Dr. **WOLFFBERG** (Breslau).

Analysis of the author's memoir which appeared in Beitræge zur Augenheilkunde, January, 1895, by Dr. VAN DEN BERGH.

(Translated by Charle W. Stevens.)

A dioptric apparatus is perfect, when, in addition to emmetropia, there is a perfect transparency of the media. In this case, visual acuity is greater than $\frac{5}{5}$; it is $\frac{5}{4}$, $\frac{5}{3}$, or even $\frac{5}{2}$. Such a degree of acuity is obtained when, in an otherwise normal and perfectly transparent eye, low degrees of H, M, or As. are corrected.

The visual acuity is commonly expressed by the smallest angle under which two distinct points are clearly seen. This is true, on condition that there is no astigmatism. In fact, in order that this measure of visual acuity be strictly exact, the two points should be distinctly seen, whatever be the direction of the line uniting them. The letters of the alphabet, formed of horizontal, vertical and oblique lines, have thus very properly been chosen for test objects. Test objects, with separate points, and especially those of a single point, like Guillery's tables, should be rejected.

Wolffberg's method of measuring the degree of chromatic sense is known. He employs small squares—one of red with sides of 2 millimetres, and the other of blue with sides of 7 millimetres. If the chromatic sense is such that these squares are seen with their proper color up to 6 metres, the author infers that the visual acuity is always equal to, or greater than, $\frac{5}{6}$.

Some, as Burchard, have seemed to conclude from this assertion that the author employs single points in measuring the visual acuity.

Such is not the object of Wolffberg's method.

In this system the direct measurement of visual acuity, which is determined separately by the ordinary method, is not involved, but it is the measurement of the chromatic sense. The originality of the method rests upon the fact that he profits by the close relationship existing between the chromatic sense and the visual acuity, to be able to conclude as to the degree of the latter by knowing the value of the former.

In the functional examination of an eye, Wolffberg commences his investigation of the visual acuity without the use of a glass (V_1). If V_1 is equal to $\frac{5}{6}$ — $\frac{5}{2}$, the eye is perfect. If V_1, at first less than $\frac{5}{6}$, becomes equal to, or greater than, this by means of a correcting glass (V_2), it goes without saying that the diminution in the visual acuity was solely due to an anomaly of refraction. If the correcting glass does not increase the visual acuity, or leaves V_2 less than $\frac{5}{6}$, there is independently of, or simultaneously with, an anomaly of refraction, either a disturbance of the transparent media, or a perturbation of the functions of the photo-chemical or the neuro-optic apparatus of vision.

The significance of diminution of vision due either to a disturbance of the transparent media, or a perturbation of the neuro-optic functions is quite clear by itself. The same is not true of a diminution of vision due to a perturbation of the functions of the photo-chemical apparatus, the result of which is what is called the luminous sense. The author devotes some space to this subject. He describes the photo-chemical apparatus of the eye, which includes the nerve epithelium of the retina (layer of visual cells, external granular layer, internal limiting membrane, and layer of rods and cones), and the pigment epithelium. Then he shows how the physical phenomenon of luminous vibrations gives rise in the apparatus in question, to chemical work, which reacts on the optic fibres and arouses a sensation of light in the brain.

Clinicial experience, as well as physiology, has demonstrated the importance of the rôle played by the layer of nerve epithelium and pigment epithelium in the origin of luminous sensation. Förster was the first to call attention to this important fact; whenever the retina no longer reacts normally to the stimulation of light, there is a disturbance in the function of the pigment epithelium, which is the seat of regeneration of the retinal purple. This disturbance is due to a lesion of the choroid upon which the pigment epithelium is dependent for its nutrition.

By the term luminous sense is understood the faculty which the eye possesses of being impressed after the shortest possible time, either by the minimum clearness or a minimum difference in the light.

This is the physiological definition. But the author properly dwells upon the essentially different conditions existing between the physiologist, who examines intelligent individuals with normal eyes in a laboratory especially adapted for this purpose, and the clinician, who deals with individuals with diseased eyes, who are frequently unintelligent and who must be examined, whatever the time and the place.

Masson's disc, based on the appreciation of the minimum difference of light, or the minimum luminous contrast, the surrounding illumination remaining constant, is a laboratory instrument.

Förster's photometre, based on the appreciation of the minimum illumination, the luminous contrast remaining constant, is, on the contrary, a very practical instrument. But, like Masson's disc, its findings are not essentially confined to the luminous sense of the macula, but to the maculo-perimacular region. Furthermore, in Förster's photometre, as the eye of the subject is concealed by the ocular of the instrument, the examiner cannot be sure that the examined does not look with an eccentric portion of the retina. Nor do the two instruments give information on an essential point, the part which the condition of refraction and the neuro-optic apparatus have in the diminution of the luminous sense (function of the photochemical apparatus).

The same faults might be claimed of Chibret's chromato-photo-optometre, whatever be the great physiological value of this instrument. It does not carefully determine the photochromatic sense of the macula with the exclusion of the perimacular zone, and its indications lack precision in cases of affections of the neuro-optic apparatus, in ametropia with or without astigmatism, in corneal opacities, and in acquired or congenital daltonism.

Taking a familiar formula from differential calculus and designating the visual acuity by V_1, the dioptric apparatus by $\triangle$, the photo-chemical apparatus by Φ, and the neuro-optic apparatus by N, the author gives the following expression for the visual acuity:

$$V_1 = f(\triangle, \Phi, N). \tag{1}$$

That is to say, V_1 is a function of $\triangle$, Φ, and N.

But as the dioptric function may be expressed by the transparency of the media (μ), by the condition of refraction (ρ), and the accommodation (A), we have:

$$\triangle = f(\mu, \rho, A), \tag{2}$$

and the formula becomes:

$$V_1 = f(\mu, \rho, A, \Phi, N).$$

If we suppose the eye at rest and the media transparent:

$$V_1 = f(\rho, \Phi, N).$$

If ρ is corrected by the proper glass:

$$(3) \qquad V_2 = f(\varphi, N).$$

If we go still farther and find by Förster's apparatus that $=1$, then finally:

$$(4) \qquad V_2 = N.$$

The formula (1) indicates clearly that the three functional conditions of the eye, dioptric, photo-chemical and neuro-optic, are included in the expression V_1.

If the factor Δ is eliminated by known methods, V_1 becomes V_2 still includes the combined values of the photo-chemical and the neuro-optic functions, which is clearly expressed by the formula (3).

The problem which Wolffberg has attempted to solve is to find a practical method for expressing the respective values of φ and N contained in V_1 or V_2.

We have already seen from formula (4) that if φ is determined by Förster's photometer, N is found at the same time. But we also know that outside of other inconveniences presented by Förster's photometer as well as by all other apparatus which have yet been made, the data of these instruments, are only exact when $\Delta = 1$ and N normal. Some other method must then be found.

For this purpose Wolffberg has attempted to utilise for the determination of the photo-chromatic sense of the macula, the results previously obtained by him in his investigations on the chromato-photo-optometry of eccentric vision.

The results are as follows:

In diseases of the conducting nervous system the cerebral adnexa included, the color circles are contracted in their normal succession (blue, red, and green).

In lesions of the pigment epithelium and its adnexe, the choroid, the color circles are contracted, but with inversion of their normal succession, the red extending farther than the blue, etc.

In other words:

In diseases of the neuro-optic apparatus, red is seen less eccentrically than blue, and green less than red; in diseases of the photo-chemical apparatus the opposite takes place, the limit of the red extending farther than that of blue. Thus, in inflammations of the choroid, red is seen farther on the perimetre than blue; in detachment of the retina and albumenuric retinitis, blue appears green or black, while green and red are still perfectly recognised.

In a general way, then, concentric narrowing for blue is a sure sign of an anomaly of the photo-chemical apparatus. But one must be more circumspect in arguing from a contraction for red in favor of an anomaly of the neuro-optic apparatus. In default of any lesion simple diminution of illumination will produce narrowing of the red. If, however, the chromatic anomaly is qualitative, and if green is mistaken for gray or yellow, the influence of illumination is nil, and alteration of the neuro-optic apparatus is certain.

It is by applying these data of chromatic perimeter to the examination of clinical vision that the author has discovered this method so practical and so rich in results. The essence of this method is contained in the formula:

$$V_1 = f(\Delta, \Phi, N).$$

The author first determined the distance at which a white, red, or blue object 5 millimetres in diameter ceased to be seen with its proper color.

The illumination, as will be seen farther on, played an important part in these experiments, and the author chose daylight, with which the visual acuity of a normal eye was $\frac{5}{5}$ — $\frac{5}{4}$.

As material for red and blue he used pieces of Marx cloth attached to a black ground. For white he used a visiting-card.

A white square of 5 millimetres was still seen at 25 metres; a red square of the same size almost at the same distance, and a blue square only at 15 metres.

This method would be hardly practical, as a place 25 metres long is not generally available. By diminishing the size of the test object one might employ smaller space, but it would be necessary to so diminish the objects that their fixation, especially if they were pieces of cloth, would be impossible.

Finally, the author chose objects of different size, but which disappeared from sight at the same distance. He found that a piece of red cloth, 2 millimetres square (r^2), and a piece of blue cloth, 7 millimetres square (bl^7), were seen with their proper color up to 18 metres, when they vanished completely from sight like a white square, half a millimetre in size. For greater facility the author substituted for the one-half millimetre white square Guillery's table, which is free from all defects, for an examination of this kind, except in cases of astigmatism.

It should be said that in general one does not require a place 18 metres in length. Practically, in anomalies of refraction and neuro-retinal affections, even the most benign, V_1, is rarely greater than $\frac{5}{6}$. But for V_1 $\frac{5}{6}$, red and blue (r^2) and (bl^7) are seen at a less distance than 6.50 m.

But before going farther, let us consider with the author the influence of daylight on visual acuity and the perception of red and blue. In the experiments carried on for this purpose, the colors employed were as pure as the spectrum colors. The test objects were seen under the same visual angle, and the luminous contrast between the objects examined, and the objects surrounding it remained the same during all the experiments. These were then based on the same principle as the examination with Förster's photometer.

Wolffberg chose normal eyes with acuity of $\frac{5}{3}$ and $\frac{5}{2}$. He experimented during the afternoon of clear winter days at near intervals.

The following table contains the results of his experiments:

(A). *Table showing the influence of gradual diminution of daylight on the visual functions.*

Time.	V_1.	Diameter of visible r (bl) at 5 metres.	Maximum distance at which are seen r^2 (bl^7).	r^{100} (bl^{100}).
2.30	5/3—5/2	1^{mm} (4)		
3.	5/3	1/2 (5)		
3.15	5/4	4 (10)		
3.30	5/5	7 (100)	4.25^m (3.50)	— (5.)
3.45	5/6	9 —	4. (3.25)	— (5.)
3.50	5/10	10 —	3. (3.)	— (5.)
4.	5/15	20 —	1.75 (2.75)	— (5.)
4.5	5/20	30 —	1.50 (2.50)	— (5.)
4.8	5/30	100 —	1. (2.)	5. (5.)
4.10	5/50	— —	0.80 (1.50)	5. (4.)
4.12	4/50	— —	0.70 (1.50)	4.75 (4.)
4.20	3½/50	— —	0.50 (1.50)	4.50 (4.)
4.30	3/50	— —	0.35 (1.50)	4.25 (4.)
4.35	2½/50	— —	Vacat (1.)	4. (4.)
4.40	2/50	— —	— (0.75)	2. (3.)
4.45	1½/50	— —	— (0.50)	Vacat (2.)
5.	1/50	— —	— —	— (1.)

This table gives important information as to the relative quality of spectral light which composes the daylight at the different hours of the day.

If, during the experiment, a spectroscope is directed to the quarter of the sky which is furnishing the illumination, it will be observed that the different colors of the spectrum diminish in variable proportion as the day declines. At first all the solar spectrum is present except pure yellow. Then r^2 and bl^7 are seen in their normal proportions. At five o'clock, when neither r^2 nor r^{100} are longer distinguished even very close by, but when bl^{100} is still seen at a distance of 1 metre, the spectroscope shows only the presence of blue.

In the table the comparative values of V_1, r and bl at different hours of the day are given. The table then gives exact information of the quality of light, which serves as a stimulant for the various degrees of V_1.

By comparing the figures of the table, it will be noticed that while V_1 has decreased from $\frac{5}{2}$ to $\frac{5}{5}$, *r*, to be still seen at 5 metres, must only increase from 1 millimetre in diameter to 7 millimetres, while *bl* must increase from 4 to 100 millimetres. It, therefore, results that in daylight, which gives a visual acuity equal to, or greater than, $\frac{5}{5}$, the red rays play a far greater rôle than the blue rays.

On the other hand, for a diminution of vision going from V_1 $\frac{5}{5}$ to V_1 $\frac{5}{30}$, the sensation of red diminishes much more rapidly (r must be increased from 9 to 100 millimetres, to be still visible at 5 metres; or rather, in order to still see r^2, it must be brought from a distance of 4.25 metres to a distance of 1 metre), while under the same circumstances the sensation for blue decreases in much smaller proportions (to continue to see bl^7, it must be brought from 3.50 metres to 2 metres).

The result of this second fact is that in proportion as the visual acuïty diminishes a greater quantity of blue light compensates for a smaller quantity of red rays as excitant to the retina. This becomes still clearer, when V_1 falls from $\frac{5}{30}$ to $\frac{1}{50}$. For $V_1 = 2\frac{1}{2}/50$ r^2 is completely invisible, while bl^7 is still seen at 1 metre. When $V_T = 1\frac{1}{2}/50$, r^{100} is only seen at $\frac{1}{2}$ a metre, and bl^{100} is still seen at 2 metres. Finally, when r^{100} gives an impression of absolute darkness, bl^7 is still seen at 1 metre: V_1 is then equal to $\frac{1}{50}$.

From all these experiments this fact is derived: that in high degrees of central acuity the predominating illuminating stimulant is the red ray, and that this ray is replaced by the blue ray as the acuity diminishes. And as the act of vision depends upon the same phenomena throughout the entire extent of the retina, it will now be understood why with daylight blue is seen in the centre less distinctly than red, while with the perimeter it is seen much farther.

The author concludes from his investigation that the ideal illumination is daylight during the hours when the red rays predominate, but it should not be inferred that it is impossible to obtain normal acuity with yellow, blue or green artificial light; it is sufficient to make them properly intense. But the eye will never be so perfectly at ease as under the normal conditions of sunlight, under the influence of which it has developed and perfected itself.

If one desires to apply the author's investigation to the value of a given artificial illumination, the result would be that the light containing the greatest number of red rays is the most desirable, and that the most harmful is that in which the blue or violet rays predominate. In fact, to produce sufficient illumination this latter light must be very intense, but from this fact it brings strongly into play its special chemical action to the detriment of the photo-chemical layer of the retina.

To return now to the author's method of examination, and resuming the practical conclusion which he draws as to the influence of variations of daylight on the visual functions, it should be said that an illumination which enables a perfectly normal eye to see r^2 bl^7 respectively, at 4¼ and 3½ metres procures for it a visual acuity equal to ⅚, but never greater. On the other hand, examination of the chromatic sense should never be undertaken unless the conditions of illumination are such that r^1 bl^4 are still recognized at 5 metres. For practice the author has simplified these data by using four blue letters in relief, the size of Snellen's letter visible at 6 metres. The illumination is considered perfect if one of these letters is still seen at 5 metres at the least.

Although the size of the pupil and the condition of rest of the retina have some influence on the result of the examination it is sufficient in practice for the examined person to turn the back to the light and to move the eyes as little as possible.

But accommodation is a more important factor. A spasm of accommodation diminishes the luminous chromatic sense. It is then essential that this spasm shall not occur. For this reason the examination is better performed by slowly removing the object than by bringing it progressively nearer. In drawing it away accommodation gradually relaxes, while in approaching it accommodation is suddenly increased and remains constantly at a higher degree than is required by the distance.

It goes without saying that the intelligence of the examined person and practice have great influence on the results obtained.

Wolffberg has prepared a valuable table of diagnosis, which is given below. It is divided into two parts. One deals with ametropia. For this part of the table the author examined more than 2,000 persons with perfectly ametropic eyes without lesion of any kind, either neuro-optic or photo-chemical, and the transparency of the media being perfect, there was neither spasm of accommodation nor astigmatism.

The second part of the table includes only emmetropic eyes. For its preparation the author examined persons with either neuro-optic affections (commencing optic atrophy complicating various cerebral affections, alcohol and nicotine amblyopia) or disturbances of the transparent media. Persons with advanced neuro-optic affections were rejected, as with them the chromatic disturbances were no longer purely quantitative, but qualitative.

Explanation of the ametropia table.—For each value of V_1 (visual acuity without the interposition of a glass) the corresponding values of r^2 are determined (distance at which a piece of red cloth 2 millimetres square is seen), of bl^7 (distance at which a piece of blue cloth 7 millimetres square is seen), of D (degree of ametropia), and of V_2 (visual acuity after the interposition of a correcting glass). As the cases chosen were of ideal normality, V_2 was constantly very high ($\frac{5}{4}$ — $\frac{5}{5}$). It is only after V_1 $\frac{2}{50}$ that V_2 decreases progressively, a fact which signifies that in anomalies of high degree optical correction always gives an acuity below normal. Thus a myope of 20 D can never hope by the use of a correcting glass to obtain a visual acuity greater than $\frac{5}{15}$.

It will be seen than in the division of the table relating to myopia the value of bl^7 is not given. This would be useless. It is one of the characteristics of myopia that for all values of

(B.) Table of Diagnosis.

V_1	AMETROPIA.									EMMETROPIA.		
	Myopia.				Hypermetropia.					Neuro-optic affections.		Disturbances (complete) of the transparent media.
	r^2	D	V_2	P.r. cm	$r^2 — bl^7$	D	V_2		To D add according to the age : at the most.	$r^2 — bl^7$ r □ — bl □	Relative visual acuity.	$r^2 — bl^7$ r □ — bl □
5/5	5 1/2	— 0.25	5/4 — 5/5	50	5 1/4 — 6 1/2	+ 0.25	5/4 — 5/6		60 : + 0.5	4 1/4 — 6	—	4 1/4 — 3 1/2
5/6	4 3/4	— 0.5	—	—	4 1/2 — 6	+ 0.5	—		— —	4 — 5 1/4	—	4 — 3 1/2
5/8	4 3/4	— 0.75	—	—	4 — 5 1/2	—	—		— —	—	—	3 1/2 — 3 1/4
5/10	3 3/4	— 1.0	—	—	3 3/4 — 5 1/2	+ 0.75	—		— —	3 — 4	30/50	3 1/4 — 3
5/20	3 1/2	— 1.25	—	—	3 1/2 — 5 1/2	+ 1.0	—		55 : + 1.0	1 1/2 — 2 1/2	30/75	2 1/2
5/30	3 1/4	— 1.5	—	—	3 1/4 — 5 1/4	+ 1.5	—		50 : + 1.5	1 — 2	30/100	2 1/2
—	2.75	— 2.0	—	—	— —	—	—		— —	—	—	—
5/50	2.45	— 2.5	—	40	2 1/4 — 4 1/4	—	—		— —	0.80 — 1 1/2	—	1 1/2
4 1/2/50	2.30	— 3.5	—	30	2 — 3 3/4	+ 2.0	—		45 : + 2.0	—	30/300	—
4/50	2.15	— 4.0	—	25	2 — 3	+ 3.0	—		30 : + 3.0	0.70 — 1 1/2	—	1 1/4
—	1.75	— 5.0	—	20	1.75 — 2 1/4	+ 4.0	—	—	25 : + 4.0	—	—	—
3/50	1.60	— 6.0	—	17	1.50 — 2	+ 4.5	—	—	— —	0.35 — 1 1/4	vacat.	0.90
—	1.50	— 7.0	—	14	1 1/4 — 1 3/4	+ 5.0	—	—	20 : + 5.0	—	—	—
2/50	1.40	— 8.0	—	12	0.90 — 1 1/2	+ 5.5	5/8	5/5 — 5/6	— —	0 — 1	—	0.75
										squares.	—	—
—	1.25	— 9.0	5/6	11	0.80 — 1 1/2	+ 6.0	5/10	—	— —	2 — 3	—	—
—	1.15	— 10.0	—	10	0.75 — 1 1/2	+ 8.0	—	—	15 : + 7.0	—	—	—
1 1/4/50	1.	— 11.0	5/8	9	0.70 — 1 1/4	+ 9.0	—	—	10 : + 8.00	0 — 2	—	—
1/50	0.90	— 12.0	5/10	8	0.60 — 1	+ 10.0	—	—	— —	0 — 1	—	0.50
											—	squares.
0.75/50	0.70	— 14.0	5/12	7	0.55 — 1	+ 11.0	—	—	— —	vacat.	—	3 — 2
0.60/50	0.40	— 20.0	5/15	5	0.40 — 0.90	+ 12.0	—	5/6	— —	—	—	2 1/2 — 2
0.50/50	0.35	— 30.0	5/20	4	0.35 — 0.90	+ 14.0	—	—	— —	—	—	2 — 1 1/2
0.40/50	0.30	— 40.0	5/30	—	0.30 — 0.75	+ 16.0	—	5/15	— —	—	—	1 1/2 — 1
0.25/50	or the fingers very near				0.25 — 0.75	+ 18.0	—	5/20	— —	—	—	3/4 — 1/2
Movements of the hand with an idea of the direction..........										—	—	

r_1 bl^r is equal to r^2, or exceeds it at the most by 25 centimetres.

In the column P. $r.$, the common punctum remotum is given or every degree of myopia. This is a valuable indication on which one may rely to exclude the existence of a spasm of ccommodation. In the division of hypermetropia for each egree of V_1 bl^r is always much greater than r^2. This sign is istinctive of hypermetropia.

In the division of hypermetropia, D designates the minimum alue of the hypermetropia; that is to say, the least degree of metropia which exists. This degree being known, the maxmum degree which may exist, is determined by adding to it a ertain number of dioptres, varying according to the age of he subject, and indicated in the last column. Example: let $r_1 = 4\frac{1}{2}/50$, and $r^2 - bl^r = 2 - 3\frac{3}{4}$; the table gives $V = 2$. f the subject is forty-five years old, the total hypermetropia may be $2 + 2 = 4$ D. If the subject is fifteen years old, the otal hypermetropia may be $2 + 7 = 9$ D.

In a very general way, and from a more partioular standpoint, he utility of the author's table rests in this fact: that the relaive values of r^2 and bl^r give exact indications as to the value of r_1. This is important in the examination of simulators. We will return further on to the other diagnostic indications conained in the table.

But first the author asks what is the cause of the decadence of the chromatic sense for blue in myopia.

After refuting the theory of Seggel, according to which this phenomenon is due to chromatic aberration, and showing that an emmetropic eye rendered myopic by a convex glass does not present this characteristic, the author concludes that the cause rests in an anatomical process which brings about elongation of the optical axis: accommodative tension, chronic inflammation of the choroid, consecutive alteration of the photo-chemical membrane of the retina and, consequently, diminution of the chromatic sense for blue.

It is by developing this idea and by studying the value of the chromatic sense relative to blue in the various forms of myopia which were presented for examination, that the author throws an entirely new light on the pathogenesis and the diagnosis of progressive myopia. The following are the diagnostic indications given by the table.

1. The comparative value of V_1, r^2, bl^r give an approximate idea of the class of anomaly with which one is dealing, of its degree, of the accommodative tension and of V_2.

2. bl^r is directly related to the qualitative anomaly of refraction and the accommodative tension. Its absolute value is not measured, but its value relative to r^2

3. If bl^r is greater than r^2 by less than 25 centimetres, the diagnosis is myopia.

4. If bl^r exceeds the value of r^2 by more than 25 centimetres, the diagnosis is hypermetropia.

5. Accommodative tension is at the minimum:

(*a*) When in myopia bl^r exceeds r^2 by from 20 to 25 centimetres.

(*b*) When in hypermetropia the relation of bl^r to r^2 has the value given in the table.

Remark: A minimum tension is favorable in myopia in the sense that in this case the myopia has not a tendency to progress, and consequently the functions of the macula maintain their integrity.

A minimum tension is unfavorable in hypermetropia for the reason that it prevents the hypermetropia from diminishing, and that it provokes amblyopia ex anopsia.

6. Diminution of the blue sense indicates:

(*a*) A disturbance of the transparent media.

(*b*) Myosis: senile myosis included.

(*c*) A photo-chemical affection with increase of accommodative tension.

7. In hypermetropia, if the influence of disturbances of the media or of myosis is included, a photo-chemical affection may render bl^r equal to, or less than, r^2, so that myopia may be suspected.

8. In myopia, a neuro-optic affection may cause r^2 to become so small that it may be supposed that there is hypermetropia.

9. A tension or abnormal relaxation of accommodation may be the result either of bad optical conditions, or of certain anatomical arrangements.

(*a*) As bad optical conditions should be mentioned disturbances of the transparent media, astigmatism, and hypermetropia of high degree.

(*b*) Among the unfavorable anatomical arrangements are especially in myopia, resistance of the papillo-peripapillary region to the accommodative tonus. This does not improve, and depression is exerted on the macula to the great detriment of central vision. In hypermetropia the same conditions cause converging strabismus. In both cases a papillary neuritis (neuritis of myopia and hypermetropia) is established, which brings about the spasm with the consequences mentioned.

10. V_1 is closely related to the degree of the anomaly of refraction.

(*a*) In myopia with minimum tension of accommodation, D is, *at the most*, equal to the figure given.

(*b*) In hypermetropia with minimum tension of accommodation, D is, *at the least*, equal to the figure given.

11. Exceptions to 10 *a*:

If a control examination indicates a degree of myopia greater than would be expected from the figures in the table, there is an abnormal increase of V_1 due, excluding pressure of the lids and myosis, to the employment of eccentric vision. For example, if in a myopia of a certain degree, and capable of correction by glasses, the use of the latter does not increase the value of V_1, it is because V_1 was the expression of the eccentric vision of the perimacular retinal zone.

12. Exception to 10 *b*:

When the control examination gives a degree of hypermetropia less than would be expected according to 10 *b*, the abnormal diminution of V_1 is due, if the influence of myosis is excluded, to a restrictive use of the sense of projection (amblyopia from anopsia in strabismus).

13. In myopia with excessive tension of accommodation, D is less than V_1 would indicate.

14. In hypermetropia with increase of accommodative tension, D is greater than V_1 would indicate.

15. The red sense (r^2) is closely related to the neuro-optic function and the value of V_2. r^2 is not measured absolutely but relative to the value of V_1.

(*a*) If r^2 in comparison to V_1 has the value indicated in the table, V_2 is normal.

(*b*) If r^2 has a less value; V_2 will be below the normal value.

(*c*) If r^2 is greater, one is dealing with astigmatism (in some cases with amblyopia ex anopsia complicated with astigmatism).

16. Exceptions to 15 *a*:

In case of astigmatism when r^2 is greater than is indicated in the table, if there is at the same time another cause for the diminution of r^2, the astigmatism may be unperceived and V_2 will not be an expression of fact.

17. Exceptions to 15 *b*:

(*a*) Diminution of r^2 may also depend upon the fact that V_1 is abnormally high (11).

(*b*) It may also depend upon daltonism, but in this case a normal value for V_2 is observed with considerable diminution of r^2.

(*c*) It may depend on a slight sensitiveness of the neuro-optical apparatus (chromatic neurasthenia).

Explanation of the Emmetropia Table.—The author has made a very interesting discovery:

When in a neuro-optic affection V_1, r^2, and bV have been determined, and the table (A) is examined, it will always be noticed that the three results correspond exactly to similar results found for a certain hour of the day.

Thus, for example, in a case of neuro-optic affection where $r^2 = 0.80$, $bV = 1.5$, and $V_1 = \frac{5}{50}$, we have exactly the same figures which are given by the table of illumination for a normal eye at ten minutes past four.

But we have seen that in proportion as the daylight diminishes, the diminution of V_1 is intimately connected with a considerable decrease in the relative quantity of red light, while, on the contrary, the blue rays gradually increase.

If, then, an ocular affection produces, under good illumination, the same chromatic phenomena which a defective illumination produces in a good eye, it goes without saying that this affection cannot be situated in the photo-chemical apparatus, but in the conducting apparatus (neuro-optic). As to bl^7 in neuro-optic affections, a comparative glance at the tables (A and B) show, it is true, that up to V_1 $\frac{5}{20}$ the sensation for blue in relation to red diminishes more rapidly with the daylight than in neuro-optic affections, but this does not alter the principle, and after V_1 $\frac{5}{20}$ the diminution is the same in both conditions.

In the column devoted to disturbances of the transparent media the author gives the values of r^2, bl^7 for each value of V_1 of the table of refraction.

Given any value whatever of V_1 in ametropia with diminution of bl^7, this diminution, when there are no disturbances of the transparent media, indicates a photo-chemical affection.

If the media are cloudy, the column indicates to what extent the diminution of bl^7 may be accounted for by these disturbances alone. A greater diminution denotes a photo-chemical affection.

The column gives the same indication in regard to r^2 and neuro-optic affections.

This method of examination is important in cases where cloudiness of the media prevents ophthalmoscopic examination.

The use of large squares of red and blue, brilliantly illuminated, lead to the diagnosis of a photo-chemical or neuro-optic affection.

Wayne County Medical Society

On examining Wolffberg's table, it will be seen that there is no special column for photo-chemical affections. This column is not necessary. φ is sufficiently determined from the elements of the table by comparing V_1, r^2, and bl^7.

Again the table shows us that the relative values of r^2, bl^7 for corresponding degrees of V_1 do not at first present great differences from V_1, but that these differences are increased after $V_1 \frac{5}{10}$. From this degree V_1 diminishes more rapidly than r^2, bl^7.

It is a characteristic sign of an anomaly of refraction, especially of myopia, that r^2 is still perfectly seen near by when $\triangle$ has reached quite an abnormal degree with V_1 much reduced. If r^2 is no longer seen in cases of this kind then the table indicates either a neuro-optic affection or a disturbance of the media.

For example, $V_1 \frac{2}{10}$, 0 — 1 clearly denotes a neuro-optic affection.

The characteristic differences of the chromatic luminous sense in high degrees of $\triangle$, φ and V should attract our attention in case of simulation:

If the subject pretends that r^1 is no longer seen near by, and if there is no cloudiness in the media, one can only be dealing with N or φ. Colored squares are then employed. If the blue is seen less perfectly than red, or as well, there is a photochemical affection, and if the contrary is true, a neuro-optic affection, and the ophthalmoscope will decide the question. But there are cases where the ophthalmoscope shows no lesion. In such cases diminution of the blue sense would plead in favor of:

(*a*) Idiopathic hemeralopia.
(*b*) Latent chorio-retinitis.
(*c*) Pigmentary retinitis without pigment.

Diminution of the red sense would suggest:

(*a*) Retinal hyperæsthesia.
(*b*) Anæsthesia of the central organs.
(*c*) Retro-bulbar optical affections (most frequently unilateral).

QUALITATIVE ALTERATION OF THE CHROMATIC LUMINOUS SENSE.

I. *Qualitative alteration of red.*—This indicates a neuro-optic affection. Examination, however, should be made with small text objects. Red is generally seen, yellow, brown, or green. In neuro-optic affections, large red objects are seen with their proper color. If, on presenting both small and large objects, the qualitative chromatic alteration mentioned is found, the case is one of daltonism.

To facilitate diagnosis, it should be remembered that in neuro-optic affections green is more involved than red, while bl^7 is intact.

If the disturbance is unilateral, it would suggest *acquired* daltonism.

II. *Qualitative alteration of blue.*—Qualitative alteration of blue, especially with integrity of the red, denotes a photo-chemical affection. Simon has recently called attention to blindness for violet in albuminuric retinitis, a phenomenon which, according to Simon, is due to an alteration of the blue photo-chemical substance.

According to Simon there is an anomaly of the yellow chromatic sense in albuminuric retinitis when it is accompanied with neuritis.

The author has already called attention to a clinical fact of the same nature; that is, an alteration of yellow and blue in papillitis from stasis. In this case, yellow and blue appear white, and red frequently yellow. Sometimes these colors are seen normally with diminished illumination. In this case there is a combination of neuro-optic affection and photo-chemical lesion from œdema of the retina.

ADNEXA. *Supplementary diagnostic indications given by the column of disturbances of the media.*—1. Complete disturbance of the transparency of the media diminishes r^2 as well as bl^7.

If the disturbance is partial, distinction should be made between a central and a peripheral disturbance.

(*a*) In central disturbance (the optical line) r^2 is more affected than bl^7, and the more so as the disturbance approaches the macula.

(*b*) In peripheral disturbances bl^7 is more affected than r^2.

3. If the disturbance of the media is complete and of a yellow color, yellow is seen as white, blue as black, and red as red.

If the disturbance is red in color, red, and in all cases yellow, are seen as such.

4. When r^{2}, $r\square$ for a given V_1 have the value indicated in the table, N is normal. When this value is not reached, N is diminished. If this value is exceeded there is ametropia more or less capable of correction.

5. When bl^{7}, $bl\square$, reach the degree indicated for V_1 in their column, the photo-chemical apparatus is normal. If this value is not reached, φ is diminished. If it is exceeded, the disturbance is peripheral and complete.

TWO PROBLEMS IN THE CORRECTION OF CORNEAL ASTIGMATISM BY CYLINDRICAL GLASSES

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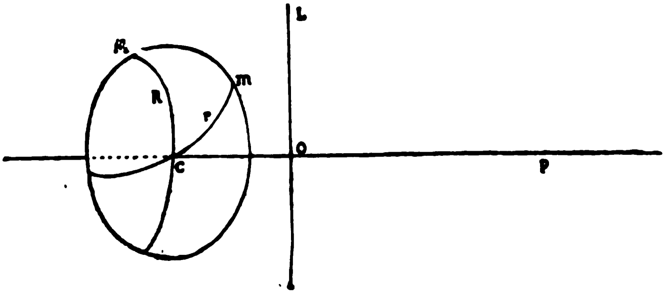
FIRST PROBLEM.

Given a refractive surface separating two media of indices 1 and n. This surface is an elipsoid cup having at principal radii of curvature at the point c, R, and r; R corresponding to the section CM, and r to the section Cm.



In front of the surface c, at a negligeable distance, is placed a cylindrical lens of no thickness.

At a distance CP from c, in the medium of index 1, is placed a small circle perpendicular to the axis of the system, and with its centre in P.

This small circle gives a real image on the other side of the system.

It is desired to make this image a circle.

For this purpose: 1. Should the lens be converging or diverging? 2. What should be the principal focal distance of the lens?

First case.—Let us first suppose that the axis of the cylindrical lens is perpendicular to the plane of the figure and is projected in *o*; that is to say, is in the plane of the section C*m*.

Under these conditions the cylindrical lens does not influence the diameter of the image given by the section C*m*, since the axis of the cylinder is in the plane of this section.

The problem then consists in finding what conditions the lens *o* must fulfil in order that the refractive system (OL, CM) shall be equivalent to the refractive system C*m*.

In all the formulæ and calculations which follow I have adopted the following arrangement of signs:

All distances are measured from the summit C, positively from the side whence the incident light falls, and negatively on on the opposite side.

A. *Refraction through the system* (OL, CM).—1. *Through the lens.*—Let p and p' be the distances from the point P and its image P' to the point *o*, or, what amounts to the same thing, to the point C; the refraction is given by the formula

$$(1) \qquad \frac{1}{p} - \frac{1}{p'} = \frac{1}{f}$$

f being the focal length of the lens.

2. *Through* CM.—The image P' becomes an object for the surface CM and gives an image P' in the second medium at a distance p' from *c*. This distance is given by the formula

$$(2) \qquad \frac{1}{p'} - \frac{n}{p'_1} = -\frac{1-n}{\mathrm{R}}$$

To obtain the total refraction it is sufficient to eliminate

p' from these two equations. Adding the members we obtain:

$$(3) \qquad \frac{1}{p} \quad \frac{n}{p'_1} = \frac{1}{f} - \frac{1-n}{R}$$

This expresses the refraction through the refractive system (OL, CM).

B. *Refraction through* Cm.—In the section C*m* the refraction is also expressed by the formula

$$(4) \qquad \frac{1}{p} - \frac{n}{p'_1} = -\frac{1-n}{r}$$

Since it is desired that the refraction in this system be the same as in the first system it is sufficient to equate the two expressions (3) and (4). This gives us:

$$\frac{1}{f} - \frac{1-n}{R} = -\frac{1-n}{r}$$

and therefore

$$f = \frac{1}{n-1} \cdot \frac{rR}{R-r}$$

This is the principle focal distance required.

The arrangement of signs made in the beginning enables us to deduct from this the sign of the interposed glass. For:

If $R > r$ $f > o$ converging lens.
If $R < r$ $f < o$ diverging lens.

n is, of course, supposed to be greater than 1.

Remark.—The correction of this problem involves the correction of the myopic or hypermetropic astigmatism.

Suppose, in fact, that the refractive surface under consideration be the cornea, and that r be the radius of curvature of an emmetropic section.

If R is greater than r, the astigmatism of the cornea is hypermetropic and, from what precedes, it may be corrected by a convex cylindrical lens the axis of which should be situated in the plane of the emmetropic meridian. This is precisely what clinical experience teaches.

If R is less than r the corneal astigmatism is myopic. From the formula above it is corrected by a concave cylindrical lens with the axis situated in the emmetropic meridian.

Here again theory is in accord with practice.

Second case.—Let us now suppose that the axis of the lens is placed in the plane of the meridian CM.

A calculation identical to the preceding leads to the following expression for the required focal length:

$$f = -\frac{1}{n-1}\,\frac{\mathrm{R}r}{\mathrm{R}-r}$$

It is equal, but of opposite sign, to the value found in the former case.

If R is $> r$, f is negative and the lens is diverging.

If R is $< r$, f is positive and the lens is converging.

Remark.—The result of this second case is that hypermetropic astigmatism may also be corrected (theoretically) by a diverging lens, the axis of which is perpendicular to the emmetropic meridian and myopic astigmatism, by a converging lens with the same arrangement of axis.

It is evident that this correction would not be proper in practice, for, by following this procedure, the refracted rays would be adjusted by giving to the emmetropic meridian an ametropia equal to that which it is desired to correct.

Physically, the result is the same; physiologically, it is quite different; and clinically, it is unacceptable.

SECOND PROBLEM.

A convex elipsoid mirror has, at the point C, as principal radii of curvature, R and r, R corresponding to the section CM and r to the section Cm.

A cylindrical lens OL of no thickness is placed in front of this mirror at a distance OC from the summit C, which we will suppose to be negligeable.

At a distance CP from C a circle is placed perpendicular to the axis CO of the system and with its centre at P. This small circle gives a virtual image which a non-astigmatic observer regards from the point P.

It is desired to make this virtual image a circle for the observer placed at P.

For this purpose:

1. Should the cylindrical lens be converging or diverging?
2. What should be the principal focal length of the lens?

First case.—Suppose first that the axis of the cylindrical lens is perpendicular to the plane of the figure and is projected in o; that is to say, contained in the plane of the section Cm.

As in the preceding problem, the lens has no influence on the diametre of the image given by the section Cm.

The problem is then reduced to finding what conditions the lens o must fulfil in order that the system (OL, CM) shall be equivalent to the system Cm.

The same interpretation of signs will be adopted as in the first problem.

A. *Effect of the system* (OL, CM).—We have here for consideration the first passage of the luminous rays through the lens, reflection from the mirror, and the second passage through the lens.

1. *First passage through the lens* OL.—If the mirror were not present, the object P would produce an image situated at P' at a distance p' from the point O, given by the formula:

$$\frac{1}{p} - \frac{1}{p'} = \frac{1}{f} \tag{1}$$

2. *Reflection in the meridian* CM *of the mirror.*—But the image P' is not formed. The luminous rays issuing from P are reflected, and unite, after reflection, in a point P'', image of P' on the mirror, at a distance p'' from C, given by the formula:

$$\frac{1}{p'} + \frac{1}{p''} = -\frac{2}{R} \tag{2}$$

in which the signs of p', p'', and R agree with the former conventions.

3. *Second refraction through the lens* OL.—The image P'' becomes in turn an object, and gives, after refraction in the lens, an image P'_1 at a distance p'_1 from C. Remembering that the sight now travels in a direction opposite to its first direction, the following expression is obtained for the second refraction:

$$(3) \qquad -\frac{1}{p''}+\frac{1}{p'_1}=\frac{1}{f}$$

The total effect of the system (OL, CM) is obtained by eliminating p' and p'' from these three equations. This is accomplished by adding them member for member, and we have:

$$(4) \qquad \frac{1}{p}+\frac{1}{p'_1}=2\left(\frac{1}{f}-\frac{1}{R}\right)$$

B. *Effect of the system* Cm.—The image of P in the meridian Cm of the mirror is given by the formula:

$$(5) \qquad \frac{1}{p}+\frac{1}{p'_2}=-\frac{2}{r}$$

Let us now suppose that the images of the two diametres of the circle in the preceding systems are equal. Then, by equating the two expressions (4) and (5) we have the formula:

$$-\frac{1}{r}=\frac{1}{f}-\frac{1}{R}$$

and therefore

$$f=-\frac{rR}{R-r}$$

This is the focal length of the interposed lens.

The sign of this lens may be deduced from this formula as before by remarking that

If R is $> r$, f is $< o$, and the lens is diverging;

If R is $< r$, f is $> o$, and the lens is converging.

Remark.—If the reflecting surface under consideration is a cornea and if r is the radius of curvature of an emmetropic section, two results, capable of clinical application may be inferred from this problem.

If R is $> r$, the astigmatism is hypermetropic and the lens which, *for the observer*, will correct the lack of symmetry of the cornea is a diverging cylindrical lens with axis situated in the emmetropic meridian.

If R is $> r$, the astigmatism is myopic and the lens which the observer should employ in order to see a circle as the image of the primary circle is a positive lens with axis situated in the emmetropic meridian.

Second case.—Suppose now that the axis of the lens is placed in the plane of the meridian CM.

The problem will result in showing that the system (OL, C*m*) is equivalent to the system CM.

By a calculation similar to the former the following expression will be found for the focal distance of the lens required:

$$f = \frac{\mathrm{R}\,r}{\mathrm{R} - r}$$

From this the sign of the interposed lens may be inferred.

$\mathrm{R} > r \quad f > o$ converging lens.

$\mathrm{R} < r \quad f < o$ diverging lens.

Remark.—On the same hypotheses as in the first problem it will be seen that if R is $> r$, the astigmatism is hypermetropic and that if R is $< r$, it is myopic.

Therefore, the first is corrected for the observer by a positive cylindrical lens with axis in the hypermetropic meridian and the second by a negative cylindrical lens with axis in the myopic meridian.

Clinical results.—The combination of these two problems is nothing more than an elementary theory of Placido's disc, and its application to the investigation of correcting cylindrical glasses for astigmatism.

It only remains to show how, from these two problems, the well-known method of objective examination of astigmatism by Placido's disc is evolved, and what position the correcting lens should occupy in relation to that occupied by the cylindrical lens employed for the objective examination.

To facilitate this comparison let us collect in one table the results furnished by the preceding problems.

	Correcting lens (Subjective examination.)	Objective examination.	
		With + lenses	With — lenses
Hypermetropic astigmatism......	**Axis of the lens situated in emmetropic meridian.**	**Axis in hypermetropic meridian.**	**Axis in emmetropic meridian.**
Myopic astigmatism.............	**Axis situated in emmetropic meridian.**	**Axis in emmetropic meridian.**	**Axis in myopic meridian.**

If the astigmatism is compound the table becomes somewhat different, and we then have:

	Correcting lens (Subjective examination.)	Objective examination.	
		With + lenses	With — lenses
Compound hypermetropic astigmatism.........	**Axis of lens placed in meridian of greatest curvature.**	**Axis situated in meridian of least curvature.**	**Axis in the meridian of greatest curvature.**
Compound myopic astigmatism....	**Axis in meridian of least curvature.**	**Axis in meridian of least curvature.**	**Axis in meridian of greatest curvature.**

As for mixed astigmatism it frequently requires the use of crossed lenses, the axis of each of which is determined from the first table.

From the preceding considerations it will be seen that if an observer regards the image of Placido's disc on the cornea and renders it circular by the interposition of cylindrical glasses, two cases may be presented:

1. *Hypermetropic astigmatism.*—(*a*). If subjective examination is made with a positive lens, the axis of the correcting lens is 90° from the axis of the lens which rendered the image of Placido's rings circular.

(*b*). If the examination is made with a negative lens, the axis of this lens is also the axis of the correcting cylinder.

2. *Myopic astigmatism.*—(*a*). If the examination is made with a positive lens, the position of the axis of this cylinder is also that of the axis of the correcting cylinder.

(*b*). If the examination is made with a negative lens, the position of the correcting cylinder is obtained by turning the interposed lens through 90°.

This is the clinical method ordinarily employed.

It is proper to say, however, that if this method does give the position of the *axis* of the correcting cylinder it does not indicate the *number* of the lens.

The focal length of the correcting lens, calculated in the first case of the first problem, is:

$$f = \frac{1}{n-1} \frac{r\,R}{R-r}$$

In the second problem the lens which equalises the bundle of rays received by the observer, has, under the same conditions, a focal length:

$$f_1 = \frac{r\,R}{R-r}$$

This focal length is different from the preceding.

To take, then, as correcting lens the lens indicated by the objective examination would be to commit an error which would be quickly shown by subjective examination.

In cases where the interposed lenses are very thin and where the lens is supposed to be in contact with the cornea, the relation $\frac{f}{f_1}$ is in absolute value:

$$\frac{f}{f_1} = \frac{1}{n-1}$$

that is about 2.

This would mean that the number of the correcting lens is about twice as great as is indicated by the lens in the objective examination.

AN ADJUNCT TO THE METHODS OF HANDLING EPIPHORA

By Dr. **J. H. WOODWARD,**

Professor Diseases of the Eye, Ear, and Throat, University of Vermont.

As an adjunct to the well-known methods employed in the treatment of epiphora, removal of the posterior wall of the inferior canaliculus, together with complete extirpation of the caruncle, has afforded satisfactory results in many of my cases during the past two years. The operation was suggested to me by the fact that an enlarged caruncle pushes the posterior wall of the inferior canaliculus against its anterior wall, and obstructs in that way the outward current of tears. If this be true in any case, it is obvious that slitting the canaliculus, division of strictures, repeated probing, and syringing will fail to relieve the epiphora.

Addition of the operation, herein suggested to those and other common measures, will shorten the duration of the treatment, while at the same time it increases the probability of a permanent cure. No evident deformity is caused by this procedure.

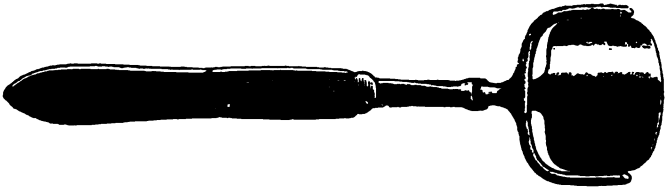
INSTRUMENTS.

A NEW HÆMOSTATIC LID CLAMP FOR PALPEBRAL OPERATIONS, AND A TRACTION INSTRUMENT FOR ENUCLEATION

By Dr. **TERSON** (Toulouse).

With the thought that we should always endeavor to improve the instruments commonly in use in order to facilitate delicate steps of certain operations, and diminish the number of necessary aids, I have devised two new instruments, the advantages of which I shall endeavor to set forth after sufficient trial of their efficiency.

The first is a hæmostatic lid clamp to take the place, in lid operations, of the similar clamps of Desmarres, Snellen, Pope, Knapp, or even the large classical plate, formerly constructed of horn, but laterally, of metal. These different models of clamps, of various form and size, produce, as is known, hæmostasis by graduated approximation of two metal plates; the one, plane, is inserted behind the lid, and the other, fenestrated, is placed in front of it. This latter plate in the models of Desmarres and his predecessors (1) was a complete metallic ring, so that no branch of the vessels could escape compression. Snellen was the first to dispense with the portion of this metallic ring



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(1) It is well understood that Desmarres, in spite of his pretention in this regard (see his Traite, Vol. II., p. 691), was by no means the first to employ a hæmostatic clamp for the lids (see the pamphlet by my son on Pellier de Quengsy and the work of this author, Vol. II., p. 149).

along the marginal border in order to avoid any disturbance in sectioning or inserting sutures in this region of the lid. Hæmostasis was then obtained, because the lateral branches of the fenestrated plate directly compressed the internal and external palpebral arteries at their point of emergence. Pope and Knapp introduced several modifications into the curvature of Snellen's clamp, but by retaining the upper portion of the fenestrated plate of Snellen's clamp the great difficulty has remained of applying sutures during hæmostasis in the skin of the lid near the brow or in the subjacent aponeurosis. It is sufficient to state that the operations for entropion by the methods of Jœsche-Arlt and Panas can not be properly performed with any of the present models of hæmostatic lid clamps on account of the particular feature which I have mentioned. In such cases a large plate is inserted under the lid which gives a perfectly free operative field but requires the aid of a skilled assistant who can render no other assistance during the operation.

To obviate this inconvenience I have had the clamp here illustrated made by Wulfing-Luer in which the entire upper portion of the ring of Desmarres, Snellen, etc., has been dispensed with. This consists of a kind of fork fitting perfectly to the lateral borders of the plane metallic plate and exerting effective compression on the internal and external palpebral arteries. Approximation of the branches of the clamp is produced by a sort of ferrule which presses more and more as it is moved farther forward. The instrument has been thus constructed so as to leave the entire marginal border of the lid uncovered. To obtain this result it is sufficient to make the plane metallic plate broad in the vertical direction. My model has the additional advantage of fitting indifferently the lid of either eye.

I can state from repeated trials that hæmostasis is complete, if the ferrule is moved as far forward as it will go.

In conclusion, this model of hæmostatic clamp accomplishes better than any other (except the plate for which an assistant is necessary) the object desired; to obtain hæmostasis by leaving the operative field perfectly unencumbered throughout th entire extent of the lid.

My traction instrument for enucleation is for the purpose o facilitating the always delicate step of dividing the optic nerve. There is hardly an operator who, at one time or another, has not cut the sclera by mischance along with the optic trunk. Thus it has been found necessary to dislocate the eye well before introducing the scissors, and various methods have been advised for this purpose.

Some draw the eye forward by the aid of a strong pair of forceps applied at the insertion of the internal or externa rectus, which has been in part preserved. Others dislocate the eye by pressing the branches of the lid speculum behind it. Some employ the finger as a conductor. Coppez has recommended passing a strong thread through the eye to draw it directly forward and thus put the optic nerve on the stretch like a cord. The method which Tillaux has proposed as a substitute for that of Bonnet, and which still further complicates the step of sectioning the optic nerve is known.

These various methods succeed fairly well in general, when one is operating under almost normal conditions, or *on the cadaver.* The same is not true, when an abundant hemorrhage obscures the operative field, or when other peculiarities complicate the manœuvres. Forceps do not firmly hold a large-sized eye, most frequently affected with hypertension. On the other hand, if there is hypotonia of the eye, traction deforms it and renders it easy to injure the sclera.

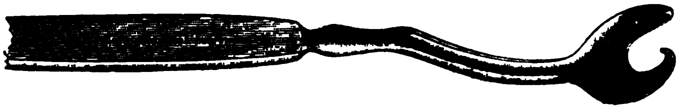
The "special spoon," which Weltz presented as a lever for dislocating the eyeball, was a fortunate innovation. Its large bowl protects the posterior segment of the eye, while its central indentation receives the optic nerve. But this instrument is too large, especially in case of children, to pass easily into the opening made by the peri-corneal incision of the conjunctiva. The central slit is too narrow, and does not permit of the ready engagement of the optic nerve without groping for it.

The inclination of the spoon on its handle does not exactly correspond to the idea of utilising the instrument as a lever.

De Wecker has more recently proposed a bifid spatula, which may also serve for enucleation. This instrument seems in certain respects to be more practical than that of Weltz. Its curvature is better for serving the purpose of a lever at the appropriate moment, but the body of the spatula is too much reduced in size, only slightly protects the eyeball, and does not receive the optic nerve with sufficient ease.

It might appear quite simple to draw the eye directly forward with the aid of double-hooked forceps, as is done in general surgery with tumors situated in deep cavities, but the great separation of the branches of the forceps required for their introduction renders it very difficult to pass the open blades sufficiently far back to obtain a firm hold on the eyeball. On the other hand there is risk of cutting on the branches of the hook with the scissors when it is desired to sever the optic nerve.

The application of two strong teeth to the extremity of Weltz's spoon, a reduction in its size, a wider slit in its centre and a modification in the form have enabled me to overcome this difficulty. I have had an instrument made by Major with a shank of marked curvature, similar to that of the bifid spatula. The instrument, thus constructed, is inserted with ease behind the eyeball, and readily engages the optic nerve. The slightest lowering of the handle combined with a forward movement of erection causes the teeth to penetrate the posterior segment of the eyeball and enables one to draw this forward with irresistible force; for when the teeth, which are sharp enough to maintain a firm hold without risk of perforation, are once inserted in the sclera, they do not loose their hold. The spoon is sufficiently large for efficient protection of the sclera near the optic



nerve. This traction instrument for enucleation will, with young operators, replace the skill which can only come from long practise. It will also be very useful when, on account of a malignant intra-ocular tumor or for some other reason, it is desired to sever the optic nerve as far as possible from the eyeball.

Note by the Editor of the Edition in English.—The instrument above described for traction in enucleation, excepting the teeth, much resembles that devised by Dr. G. Hay of Boston, and described and figured in the *Transactions of the American Ophthalmological Society*, 1874, p. 214.—G. T. S.

II.—REPORTS OF SOCIETIES

SOCIETIES

OPHTHALMOLOGICAL SOCIETY OF PARIS

Session of February 4, 1896.

Treatment of Detachment of the Retina.

DR. PARINAUD presented a patient who had recovered from non-myopic detachment of the retina in both eyes.

Mme. D——, forty years old, with no personal or hereditary history worthy of note, found, early in September, 1895, that the vision of her right eye was much diminished.

September 13th, trace of detachment of the retina extending over the lower and external half of the retina was found in the right eye, and had caused a diminution of the visual field to $\frac{2}{3}$ of its normal extent. Visual acuity was very low. The patient counted fingers at 1.50 m. In the left eye there was a less extensive detachment in the lower part with preservation of vision. $V = \frac{5}{7}$. The patient was emmetropic.

September 16th, a puncture was made in the right eye over the detachment. The left eye was not treated.

September 18th, the visual field was re-established in the right eye, and vision had increased to $\frac{5}{35}$. In the left eye there was no modification of the lesions. Instillations of atropine and rest in bed. October 21st, recovery had remained in the right eye with the exception of a slight swelling near the ora serrata. A puncture was then made with the galvano-cautery.

This puncture was followed by some cloudiness of the vitreous and a slight diminution of vision.

December 10th, it was noticed that the visual field of the right eye was normal in extent with $V = \frac{5}{25}$. In the left eye the detachment was not modified.

December 17 a puncture was made in both eyes with a Græfe knife. The detachment disappeared in the left eye and recovery continued in the right eye.

February 4, 1896, the visual fields of both eyes were of normal extent, and vision was $\frac{5}{15}$ in the right eye and $\frac{5}{6}$ in the left.

It should be stated that this double detachment was not due to myopia, but these non-myopic detachments which affect both eyes at the same time are quite as severe, if not more so than those of myopia. Furthermore, another patient that I treated recently for very extensive myopic detachment with abolition of central vision was also cured by the same treatment. Recoveries thus obtained are lasting. A patient whom I treated successfully fourteen years ago, and who has remained under observation, has had no recurrence.

Dr. Chevallereau.—Non-myopic detachments are ordinarily cured. Myopic detachments are, I think, more severe, and are rarely treated successfully. By puncturing the sclera with the galvano-cautery I should be afraid of causing atrophy of the eyeball, by leaving a persistent fistula.

Dr. Jocqs.—I observed a patient with myopia of 10 D and an extensive detachment in one eye. Reapplication of the retina was obtained after a puncture. Three days afterward a second puncture was made, and for a month the detachment has not recurred.

Dr. Abadie.—Treatment by puncture is quite an old method. Ten years ago there was a discussion between de Wecker, Dransart, and myself in *Annales d'Oculistique* as to the priority of treatment by puncture with the galvano-cautery. I performed sclerotomy simultaneously, but have abandoned these methods. I think there will be a return to intra-ocular injections, as I have obtained some permanent and extraordinary results. Some years ago, septic complications which to-day may be avoided were to be feared. Punctures are but palliative treatment. The true curative treatment is yet to be found.

Dr. Kœnig.—In a case of detachment in myopia of 3 D I obtained complete recovery which has lasted for three years.

Dr. Galezowski.—In detachment of the retina I make the puncture and the contra-puncture in the sclera. The operation should be performed as early as possible. I have been successful with five cases.

Dr. Darier.—I have treated three cases by electrolysis with a result of one recovery and one improvement. In the second case electrolysis caused atrophy of the retina, but the retina was reapplied. In the third case applications of electricity were of no avail. I then tried injections of the vitreous of á rabbit as performed by Deutschmann, but found no improvement.

Dr. Parinaud.—Many have renounced the use of injections of tincture of iodine, including Schœler, the principal advocate. As to electrolysis, I gave my opinion in this connection at the last congress of the French Society of Ophthalmology. I think that the sclero-puncturing which this necessitates is the efficient factor.

I have employed these perforating punctures with the galvano-cautery in three cases. I do not recommend them. I can simply say that they are well tolerated by the eye.

In presenting this patient I had no intention of making a general communication of detachment of the retina. Since Deutschmann's work has been alluded to, I would call attention to the fact that I have treated detachment of the retina by scleral puncture for more than sixteen years, as may be seen from a discussion at the congress of the French Society of Ophthalmology in 1883 (p. 77 of the *Bulletin*). I have endeavored to replace punctures or sclerotomy by sclerectomy in which, after removal of a portion of the sclera, I tried to obtain superficial closure of the wound by the episcleral tissue alone in order to be able to repeat the punctures, and thus obtain a more prolonged filtration. But, as I have said, this result can only be obtained by performing the operation 7 or 8 millimetres from the cornea. It should perforate the sclera farther back in the detachment.

There are, in my opinion, but two rational and efficient factors in the treatment of detachment of the retina: evacuation of the fluid and rest. By these means recovery may be obtained in detachments which are not too old and where the retina is not too greatly torn. Improvement is the rule, and Dr. Jocqs's case is an example of what ordinarily occurs.

Injections of rabbit's vitreous, as performed by Deutschmann, may be useful in temporarily increasing intra-ocular tension and favoring coaption of the retina after evacuation of the fluid. I have not had good results from injections of sterilised water, which I formerly performed for the same purpose.

The Different Causes of Lachrymal Affections.

Dr. Galezowski.—I desire to speak of lachrymal affections consecutive to exostoses of the nasal canal. In these cases, the mucous membrane is not diseased. I have observed five cases of lachrymal affections of this kind, in which there was complete and absolute obliteration of the lower portion of the nasal canal. Ordinary sounds could not be passed. I have very large sounds made so as to exert great pressure.

Three patients recovered, and two were improved.

Dr. Vignes.—I do not understand how Dr. Galezowski caused an exostosis projecting into the nasal canal to disappear by the aid of his sounds.

Dr. Galezowski.—I did not cause the exostosis to disappear, but displaced it.

Injuries to the Lens System.

Dr. Darier.—The first two cases were *traumatic myopia* of 6 and 2 dioptres, due to distension of the zonula, and recovering very rapidly, with instillations of *eserine* and the use of galvanic currents.

In a third case in which the dislocation was complete, the lens having disappeared almost completely from the pupillary field, after a single instillation of eserine, the lens suddenly resumed its place in the hyaloid fossa, after being dislocated for thirteen days, Replacement of the lens occurred without the *eserine* producing contraction of the pupil.

When the lens had resumed its place there was found to be *traumatic myopia* of 7 D, $V = \frac{1}{4}$, which soon decreased to 4 and then 3, and finally to a simple astigmatism of -1.5 D 30°, $V = \frac{2}{3}$. An attack of *subacute glaucoma* was cured by iridectomy.

In a fourth case of *dislocation of the lens* an attack of glaucoma was also perfectly cured by iridectomy.

In closing, Dr. Darier presented a drawing of a case of double *congenital dislocation of the lens*, complicated with *microphakia*. In the drawing, the diametre of the lens does not equal that of the dilated pupillary orifice, and at 30 centimetres with the erect image, the entire fundus of the eye was seen as though drawn on the posterior surface of the lens.

Dr. Vignes.—I have observed a case of acute glaucoma, resulting from injury, and during the iridectomy there was an escape of vitreous. I think that in Dr. Darier's case there was a rupture of the zonula rather than distension.

Dr. Abadie.—In many cases of incomplete dislocations of the lens glaucoma develops in spite of iridectomy. In such cases the lens should be extracted.

It is possible that eserine employed continually may prevent glaucoma.

Dr. A. Terson.—Von Græfe has already called attention to the severity of glaucoma resulting from dislocation of the lens. I would recall to your minds in this connection the case which I presented and in which, in spite of several years of absolute glaucoma, there was no attachment of the iris to the cornea, and in which, consequently, iridectomy would have been inefficient.

Dr. de Speville.—I treated a patient who, without apparent cause and with slight tension, had a dislocation of the lens into the anterior chamber. It was extracted, and recovery was permanent.

Dr. Meyer.—The return of the lens to its place is not impossible. Several such cases have been reported. It is uncertain by what mechanism this is brought about.

Dr. Parent.—This question was discussed in connection with a case of Dr. Abadie. This fact was observed after depression. I do not think that the eserine had any action, since the same phenomenon had been observed long before the invention of eserine.

Dr. Darier.—In the first case eserine might well have been the cause of these effects.

Treatment of Infectious Keratitis with Methyl Violet alone or Assisted by the Actual Cautery.

DR. CHIBRET.—There is a form of infectious keratitis, which I have called *mining*, in which the affection, instead of extending deeper and wider and outwards and inwards, gains in extent by undermining Bowman's membrane, so that this membrane is still preserved on the borders of the ulcer, while the suppuration has invaded the subjacent corneal tissue. Under these conditions the borders of the ulcer are formed of a rim of Bowman's membrane detached by the pus. Experience has shown that tincture of iodine or methyl violet penetrate with difficulty under this rim, and do not succeed in penetrating sufficiently deep to reach the peripheral limits of the infection. It is proper, then, to destroy this rim superficially with the galvano-cautery in order to give a more ready passage to the penetration of the antiseptic.

As soon as the first bandage is taken off, the ulcer is in course of repair, while without the use of the galvano-cautery the infection continues to undermine Bowman's membrane on the borders of the ulcer.

It is of course understood that tincture of methyl is only powerful in corneal infections of essentially exogenous origin, and that it is inefficient when the infection is of endogenous character, as is observed in cases of malaria, or with affections which I have described as synalgic. (*French Society of Ophthalmology,* Transactions 1889.)

As to subconjunctival injections in their application to corneal injections, they merit neither the excess of praise nor the excess of reproach which their partisans or their detractors have attributed to them. They may be of service. The principal inconvenience is that they are painful. I have almost completely replaced them by the use of a collyrium of cyanite of mercury instilled every hour, and I find that this absolutely painless method has almost the same advantages as a daily subconjunctival injection.

The method of applying the violet lightly consists in rolling a pledget of cotton on the end of a platinum wire.

The cotton is dipped in a solution of violet, but it is well to remove the excess of fluid which might extend to the healthy part by first touching it to a piece of cloth. The size of the colored surface will be the measure of saturation of the cotton most suitable for careful application to the cornea.

In conclusion, I think that at present the best method of treatment for infectious keratitis consists either in the application pure and simple of methyl violet to the ulcer, or in slight cauterization of the borders of the rim of Bowman's membrane in order to favor the peripheral action of the violet.

It is evident that the violet is indicated in traumatic or post-operative infections where it is the antiseptic of choice, and also in infectious ulcers of the cornea.

Finally, a last word in regard to hypopyon. I make it a rule to extract this by paracentesis whenever its line reaches 2 millimetres above the lower border of the limbus—that is to say, whenever it is visible at the first glance.

Dr. Darier.—As long as we are not in possession of the elements of precise differential bacteriological diagnosis, we should treat all infectious ulcers, according to the logical pathogenic ideas:

1st. *Rendering the adnexa aseptic,* and especially the lachrymal canals, the cilia, and the conjunctiva.

2d. Impregnation of the surface of the ulcer with *pyoctanin,* which renders it aseptic, and limits the morbid tissues which should be *completely destroyed with the galvano-cautery,* or the curette.

3d. *Rendering the intra-ocular media aseptic* by subconjunctival injection.

4th. *Aseptic occlusive bandage.* With this treatment failures will be very rare.

Dr. Abadie.—The galvano-cautery is a valuable instrument which should not be abandoned, but in commencing infectious ulcers of the cornea, recourse should be had to subconjunctival injection of one or two drops of a $\frac{1}{1000}$ solution of sublimate. If the ulcer is more severe or more advanced, the galvano-cautery should be used, which, properly managed, limits the disease and prevents complete destruction of the cornea.

Dr. de Speville.—Subconjunctival injections, combined with applications of tincture of iodine, have given me wonderful results in the four cases which I published.

Dr. Parent.—It seems to me more rational to apply the medications at the diseased point rather than at a distance, and I should prefer the applications rather than subconjunctival injections.

Dr. Chibret.—I did not wish to bring forward the use of methyl violet as a novelty, but to report the good results which I have had from its use.

THE OPHTHALMOLOGICAL SOCIETY OF BORDEAUX

Session of December 17, 1895.

Early Syphilitic Paralysis of the Right External Oculo-Motor and of the Left Facial.

DR. DUCLOS presented a patient, thirty-eight years old, a plasterer, with good constitution, who had contracted syphilis in August, 1895.

In September, ganglionic enlargement in the groin, roseola. End of September, diplopia from paralysis of the right external rectus, and early in October, paralysis of the left facial, both superior and inferior.

October 14 the patient came to consult Dr. Lagrange, who ordered energetic specific treatment: mercurial inunctions, injections of the oil of the bi-iodide 0.15/30, and, internally, double iodide of mercury and potassium.

The facial paralysis recovered completely after two weeks of treatment, and one month later, the diplopia had almost entirely disappeared. The chancre, which still persisted at the patient's first visit, and which had not been treated, had healed. The roseola which had disappeared from the forehead and the limbs, remained on the breast. There was noted a palmer syphilitic psoriasis of recent appearance.

What was the nature of these paralyses, and what lesions caused them? The efficiency of anti-syphilitic treatment would seem to demonstrate that they were syphilitic complications.

Dr. Badal does not agree with this etiology for the paralysis. In his opinion two facts are contrary to the syphilitic hypothesis: 1st, the very early appearance of the nervous disturbances; 2nd, their marked improvement after eight days of treatment.

Finally, considering the patient's trade and that he had been exposed to severe weather of all kinds during his work on the Exposition of Bordeaux, Dr. Badel is inclined to think that these phenomena were simply paralyses à frigore. Considering the rapidity of recovery. one might also think of the temporary paralyses premonitory of locomotor ataxia, but the hypothesis of cold seems to be more probable, Examination of the electrical reactions was not made, but it would have been a great aid in localising the lesion and in elucidating the etiological diagnosis.

Dr. Lagrange.—Dr. Badal's hypothesis would necessitate a most extraordinary coincidence. The participation of the superior facial in the facial paralysis, which is a common symptom in paralysis à frigore and in intra-bulbar paralysis, may also be accounted for by a lesion of syphilitic origin, involving both nuclei of the facial, which are very near each other. A lesion of similar nature on the right side would explain the paralysis of the external rectus.

Comparing the two hypotheses, and considering the recovery which followed anti-syphilitic treatment, Dr. Lagrange prefers to refer these paralyses to syphilis.

Lobular Pavement Epithelioma of the Lachrymal Canal and of the Nasal Fossæ.

Dr. Cabannes presented a patient with a large malignant tumor filling the left nasal fossa, and projecting into the internal angle o the left eye, which first was supposed to be a suppurating dacryocystitis. A puncture with a bistoury led to the escape of a smal amount of pus, but a large quantity of blood. A probe could b introduced in all directions and to a great depth.

Rhinoscopic examination showed the presence of a red nodula tumor completely filling the left cavity without deviating the partition. It was at first supposed to be a small-celled sarcoma.

A portion of the tumor was removed with a galvanic loop, an examined histologically. At the session of January 21, Dr. Brindel showed that the tumor was a lobular pavement epithelioma, rare neoplasm considering that the mucous membrane of the nasa fossæ in which the larger part of the tumor was found possesse cylindrical epithelium. It is probable that the tumor originated i the lachrymal canals where pavement epithelium is normal.

The patient is still under observation, and operation has not ye been decided upon.

Buphthalmus, Aniridia.

Dr. Cabannes presented a patient with buphthalmus and complete blindness. The right eye had been lost for a long time. Th left eye was very prominent, very large, amblyopic, and the iris wa absent.

Dr. Lagrange explained the aniridia by atrophy of the iris, whic was first compressed on the posterior surface of the cornea and ha then undergone sclerosing alterations and disappeared little by littl as a distinct organ.

Destruction of the Nasal Nerve.

Dr. Badal described a very favorable case of destruction of th nasal nerve to suppress the pain in suppurating iridocyclitis. Th pain disappeared as by magic immediately after the operation.

MEDICAL AND SURGICAL SOCIETY OF BORDEAUX

Sessions of December 6, 13 and 20, 1895.

Bi-temporal Hemianopsia rapidly followed by Complet Blindness in Both Eyes.

Dr. Armaignac presented a painter, twenty-three years of age pale and thin, with no pathological history of syphilis or lead-poisoning. November 22, he was seized with violent frontal headache. This was soon followed by considerable diminution in vision, especially in the right eye, the visual acuity of which was reduced to $\frac{1}{12}$ on November 25, and in which the entire external visual field had disappeared. In the left eye there was also complete disappearance of the external visual field with $V = \frac{1}{6}$. The perception of colors was normal in all the remaining portion of the visual field.

The was no disturbance of the muscular structure of the eye. The headache remained very severe. There was marked tachycardia (150–160 pulsations per minute). The pupil reacted normally to light, and the fundus of the eye was normal. Auscultation indicated slight respiratory harshness under the right clavicle.

In conjunction with Dr. Pietres, Dr. Armaignac explained these ocular symptoms by an extra-cerebral lesion, situated in the region of the chiasm, which was either a placque of tubercular meningitis at the base, an abscess, or tubercular softening of the pre-chiasmatic region.

Under iodide of potassium the headache disappeared, but vision diminished very rapidly, and on December 4 was lacking in the right eye. In the left eye vision improved somewhat, increasing to $\frac{5}{18}$. Nothing abnormal was found in the disc or in the retina.

December 10, $V = \frac{1}{24}$, OS. The internal visual field was intact. The tachycardia persisted. Since the day before there had been rumbling in the ears and biliary vomiting.

December 13, three weeks after the commencement of the hemianopsia, the patient was completely blind, with no alteration in the fundus of the eye to explain the condition.

In explanation of the tachycardia, a second lesion must be supposed situated in the floor of the fourth ventricle and acting upon the nucleus of the pneumogastric.

As all medical treatment seems to be unavailing against these lesions, would it not be proper to attack them by trephining ?

Dr. Sous.—In cases of bilateral temporal hemiopia, autopsies have almost always revealed a lesion of the chiasm. With Dr. Armaignac's patient the hypothesis of a lesion of the base is confirmed by the increase of the headache on percussing the skull—von Græfe's symptom.

Dr. Sous agrees with the diagnosis of tuberculosis. He stated that recovery was very rarely observed, and asked whether, against a disease frequently beyond the power of therapeutics, trephining would not be hazardous.

Dr. Lagrange thinks that an affection of the chiasm would, before destroying it, extend to the optic disc and there produce not immedate atrophy, but disturbances of circulation and neuritis.

A single lesion in the falx cerebri opposite the cuneus and the lingual lobe might easily compress both occipital lobes over the psycho-optical centres. Complete disappearance of vision would result from this pressure. Furthermore, such a lesion would not be far from the fourth ventricle, which it might compress through the superior cerebellar peduncles. Finally, the sensory bundle occupies the posterior portion of the internal capsule, a region quite near that in which Dr. Lagrange localised the disease.

A single neoplasm would then explain all the complications presented by the patient, and would perhaps justify trephining over the occipital lobes near the median line.

Dr. Armaignac said that Dr. Lagrange's hypothesis, although ingenious and possible, was none the less contradictory to the established theory of bi-temporal hemianopsia. It is, furthermore, extremely rare that cerebral lesions, involving the two lobes, are sufficiently limited to produce only visual disturbances.

N. B.—January 12th, the hemianopsia and headache in Dr. Armaignac's patient had completely disappeared, and vision had sufficiently recovered in both eyes, so that he could read the title of a journal.

Orbital Neoplasm.

DR. MARTIN described a case of non-syphilitic orbital tumor cured with iodide of potassium.

Dr. Lagrange thinks that the administration of iodide in cases of doubtful neoplasm may be dangerous, as the recovery of these hypothetical tumors is not a proof that the neoplasm has yielded to iodide. Finally, any neoplasm which does yield to the iodide treatment is, in his opinion, of syphilitic origin.

ACADEMY OF SCIENCES

Session of January 13.

Retinal Oscillations Following a Luminous Impression.

DR. AUG. CHARPENTIER.—In 1891, I demonstrated that the retina was the seat of rapid oscillatory phenomena produced by the influence of luminous excitations. All light falling on the retina produces a negative reaction which may be followed by several alternate positive and negative phases of decreasing amplitude. A series of various experiments have shown that under certain determined conditions of luminous intensity and duration of excitation, the primary retinal image is followed by a recurrent image, generally colorless, or of bluish appearance for slight intensities.

This is neither a special stimulation of the violet fibres, nor an elective action on the rods, as has been said, but simply a particular case, a maximum phase of the persistent image which follows every excitation. The important factor is the dark interval which constantly and immediately follows the excitation by an interval of apparent variable duration. It is a negative reaction of closure of the retinal oscillation, which, in certain cases, may assume a multiple oscillatory form.

I have thus seen, especially with blue light, double and even triple recurrent images formed of decreasing intensity, and separated by dark intervals.

SOCIETY OF NATURALISTS AND PHYSICIANS OF THE LOWER RHINE

Session held at Bonn, November 19, 1895.

Paralysis of the Trunk of the Fifth Nerve.

DR. A. SCHMIDT presented a patient with complete and isolated paralysis of the left fifth nerve, and incomplete paralysis of the second branch of the right fifth nerve. The sense of taste was lost in the anterior two-thirds of the tongue on the completely paralysed side. ' This phenomenon has been noted in all cases of complete paralysis which have been carefully studied. It is not improbable that the gustatory fibres of the corda tympani reach the brain by the trunk of the fifth nerve, but is uncertain what path they pursue in going from the trunk of the seventh nerve to that of the fifth. Do they pass by the great superficial petrosal nerve and the spheno-palatine ganglion into the second branch of the trigeminus, or by the lesser superficial petrosal nerve, and the optic ganglion into the third branch ? Isolated paralysis of the second branch of the right fifth nerve throws some light on this question. It has no influence on the taste on that side, a fact which indicates that the gustatory fibres of the corda tympani pass from the facial into the thi branch of the trigeminus.

Traumatic Aphakia.

DR. HUMMELSHEIM.—A peasant received a slight blow on the le eye while cutting wood. A short time after, fluid escaped from th eye, and the patient felt a foreign body under the upper lid. O raising it, a smooth body fell out which was crushed between the finger On the next day a wound on the limbus was found, with shar borders, situated above and inward. After reabsorption of th hyphemia, the eye was found to be aphakic with passable visu acuity. I think there was not a contusion of the eyeball, but a c from the edge of a piece of wood—that is to say, extraction of th lens performed with an unusual instrument.

Sub-conjuctival Abscess of Rare Origin.

DR. HUMMELSHEIM.—Patient, sixteen years old, had a smal purulent collection on the nasal surface of the eyeball, about 2 millimetres from the limbus, and of five days' duration. No traumatism On incision, a lash was found in the bottom of the abscess, whic had probably transported the inflammatory germs into the subconjunctival tissue. The situation of the abscess opposite the lowe left lachrymal opening makes it probable that this last came fron the lachrymal opening, and was inserted under the conjunctiva b the movements of the lids.

III.—REVIEWS OF OPHTHALMOLOGICAL JOURNALS

Albrecht von Graefe's Archiv für Ophthalmologie

Reviewed by Dr. V. MORAX.

Vol. XLI., No. 11.

I.—Contribution to the Study of the Position of the Functions of the Different Cellular Groups in the Nucleus o the Oculo-Motor, By Dr. O. STUELP.

Since the investigation of Adamuck, Hensen, and Vœlkers, it ha been known that the nucleus of the common oculo-motor was divided into a series of distinct cellular groups. Nevertheless, in spite o numerous articles which have appeared on this subject, the relation between the different terminal branches and the cellular groups has not been established. Anatomical investigations alone have shown that the nucleus of the third nerve is divided into cellular groups. But here again there are differences of opinion, and the scheme given by Perlia differs from that of Siemerling. These two authors distinguish six to eight secondary nuclei on each side. Bernheimer has recently studied the brains of twelve human embryos, and his conclusion is that the nucleus of the oculo-motor has a less complex arrangement than has been supposed. There is a principal lateral nucleus, and an anterior accessory nucleus on each side, and between the two lateral nuclei is a median nucleus.

Four methods may be employed for the study of nervous localisation:

1. Stimulation of a nucleus by an electric current. But, in this particular case, the microscopic size of the nuclei is opposed to any exactness in the result.

2. Gudden's method, which consists in extirpating an organ from a young animal and, after a longer or shorter time, investigating the atrophy of the corresponding nerve cells in the nucleus. No results have been obtained by Gudden's method, as extirpation of an ocular muscle in an animal would be almost impossible.

Stuelp examined the protuberance of a man, fifty years old, one of whose eyes had been enucleated thirty-four years previously. There was no degenerative lesion either in the nerve trunks or in the nuclei.

3. A third method consists in studying the anatomical lesions in cases of nuclear paralysis. This is the method chosen by most authors.

Kahler and Pick were the first to publish an observation of this kind. From their investigations they concluded that the fibres of the iris arise in the superior portion of the nucleus, while the posterior portions were devoted to innervation of the external muscular structure of the eye.

Von Leube studied a case of mydriasis with ptosis, hemiplegia, and crossed hemianæsthesia. The lesion (a hemorrhage of the anterior portion of the posterior quadrigemina tubercle) had destroyed the upper portion of the oculo-motor nucleus. Bœttiger published a similar case. Oppenheim, in a case of bilateral mydriasis and unilateral ptosis, found only Westphal's group affected.

Siemerling, Mendel, and Boedeker place the centre for the elevat of the lid in the lower portion, but with reservations. Westph Oppenheim, Bœttiger, and Kostenitsch localise the centre of innerv tion of the ciliary muscle and of the pupil in the supero-anteri portion of the Edinger-Westphal group, but Darkschewitsch a Bœttiger contest this localisation.

The findings of Siemerling and other authors enable us to locali the centre of innervation of the external muscular structure of t eye in the posterior portions of the oculo-motor nucleus, but witho exact data. It is thus seen that the study of pathological cases h not yet led to indisputable results.

4. The fourth method of investigation which Stuelp followed co sists in the clinical observations of nuclear paralyses.

He gave especial attention to the study of the combinations partial nuclear paralyses.

Analysis of 229 cases (published cases or cases observed in t Lagneur Clinic) led to the following conclusions:

The frequent association of paralysis of the ciliary muscle a of the iris, the not infrequent absence of paralysis of these t organs when the external muscular structure of the eye is affecte prove that these two centres are near each other. Pathologi anatomy as well as the study of cases of progressive paralysis the ocular muscles indicate that these nuclei are situated in t supero-anterior portion of the oculo-motor nucleus.

The centre for the elevator of the lids is situated near the p ceding nuclei. The frequent absence or the slight degree of pto in nuclear paralyses and in opthalmoplegia externa also shows th this centre is distinct from the cellular groups corresponding to t other ocular muscles. Cases of paralysis of the internal, superi and inferior recti without ptosis would show that this centre is n placed between the group corresponding to the superior rectus a that of the interior rectus, as Hensen and Vœlkers have stated.

Immediately behind the centres for the iris and the ciliary mus are the centres of the superior rectus and of the inferior rect Behind these are the centres for the inferior oblique and the inferi rectus.

The table compiled by Stuelp is based on clinical facts and do not differ specially from that given by Kahler and Pick, and aft wards by Starr.

Cases of progressive ocular paralysis would favor this table.

In a syphilitic case observed by Rosenthal, there was first ophthalmoplegia interna, then six months afterwards paresis of the internal rectus and of the inferior rectus, and finally ptosis and limitation of movement of the elevator.

Stuelp then endeavors to reconcile his clinical deductions with the anatomical distinction of Siemerling and Perlia, but it seems of of no avail to follow him through these hypothetical speculations.

II.—**Contribution to the Study of Glaucoma,** by Dr. W. Koster.

On making a critical review of the different theories of glaucoma, one is confronted with a series of questions which can not be solved by clinical observation, but which may be studied by experimental methods. This was the object of the author and the results of his experiments on rabbits are given in this very conscientious, but not well-digested memoir.

Result of ligature of the venæ verticosæ in the rabbit.

Koster describes the operative method for partial or total ligature of the venæ vorticosæ. He studied its effects, immediate and distant, on a number of rabbits.

The tension was measured with Fick's ophthalmotonometre. He found from these experiments that a group of symptoms comparable to human glaucoma could never be obtained by partial or complete ligature of these veins. Complete ligature is followed immediately by an increase of tension which is not glaucoma, for it is very rapidly transformed into hypotonia. The hypertonia is not of sufficient duration to produce the secondary alterations of glaucoma.

This venous ligature, on the other hand, always causes pigment deposits of hæmatic origin, modifications of the pigment epithelium and of the layer of rods, proving again that the nutrition of the external layers of the retina depends upon the choroid. Frequently parenchymatous keratitis develops, which recovers when collateral circulation is established. The cataract which also occurs should be considered as a disturbance of nutrition. This cataract is similar in appearance to that obtained by naphthaline. Venous obliteration also determines an adhesion of the periphery of the iris with the sclera. This adhesion is produced after several hours, but then diminishes and only remains at certain points. On eyes presenting these lesions manometric experiments have shown that filtration of fluids from the anterior chamber takes place in a normal manner.

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The author concludes that no credit should be given to the theories of glaucoma which suppose that venous stasis of the venæ vorticosæ is the primary cause.

Tension of the choroid and of the retina.

Do the choroid and the retina support a portion of the intra-ocular tension? Koster's experiments give a negative reply to this question. The choroid may, it is true, be somewhat tense when the tension of the sclera is normal. There may also be, both on the external and the internal surface and in the tissues of the choroid, a lymphatic tension, slightly different from the intra-ocular tension, for both are functions of the blood pressure. The same is true of the retina. The fact found by Donders that the choroid retracts slightly when the eyeball is incised, immediately after enucleation, does not prove that it supports a part of the intra-ocular tension.

The reciprocal relation between the pressure in the vitreous and that in the anterior chamber.

Experimentally, there is no appreciable difference between the tension in the anterior chamber and that in the vitreous. Intra-ocular tension is always equalised in these two portions of the eyeball.

The lymphatic current from the posterior chamber to the anterior chamber.

Authors do not agree as to the path taken by the lymphatic current from the posterior to the anterior chamber. Ulrich, among others, admits that the most important current passes through the base of the iris.

The author's experiments have not enabled him to form definite conclusions in this respect. It would seem, however, that a portion of the intra-ocular fluid passes through the pupil.

III.—**Contribution to the Study of Intra-Ocular Tonometry and Manometry,** by Dr. W. KOSTER.

IV.—**Bacteriological Investigations as to the Etiology of Eczematous Keratitis and Conjunctivitis; Considerations of the Division; Etiology and Prognosis of Corneal Ulcers,** by Dr. L. BACH.

Gifford isolated six varieties of microbes from the conjunctiva in eczematous conjunctivitis, but he was unable to form definite conclusions from his investigations. Burchardt, in 1887, found twice in six cases of phlyctenular conjunctivitis a micrococcus producing yellow colonies. In 1886, Duclaux and Boucheron isolated cocci in eczematous conjunctivitis, the pathogenic properties of which resembled those of the coccus of osteomyclitis and furuncle. Straub studied simultaneously the palpebral and conjunctival lesions, and found the staphylococcus pyogenes albus and aureus in them. Bach has continued this study. He cleansed the conjunctival sac with a sterilised physiological salt solution, bathed the surface of the efflorescence with a piece of cotton, and fertilised his culture media with scrapings from its surface.

While the cultures made from the contents of the conjunctival sac almost always revealed colonies of staphylococci, only once in twenty-one cases examined was Bach able to isolate the staphylococcus aureus from the efflorescence proper. In all the other cases the result was negative. The absence of staphylococci in the majority of cases is probably due to the fact that the staphylococci disappear quite rapidly from the interior of the efflorescence, and colonies are only obtained when the efflorescence is of recent date.

In the rabbit and in man Bach has produced lesions similar to phlyctenular lesions, by inoculating the staphylococcus aureus with a lancet. The lesion developed at the point of inoculation, and here also the staphylococcus was only discovered the first day after inoculation. Bach thinks that the appearance of the efflorescence is preceded by a slight loss of substance which serves as point of penetration for the staphylococci.

The ocular affection is of the same nature as the eczematous lesions found simultaneously in other parts of the body.

On the other hand, there is no relation between the so-called scrofula and these ocular lesions. As for treatment, Bach thinks that local treatment is sufficient, and that atropine is contra-indicated when the lesions are confined to the conjunctiva.

V.—The Pathological Anatomy and Pathogenesis of Œdematous Neuritis (Stauungspapille), by Dr. Elschnig.

A distinction based upon clinical observations has been established between descending neuritis and œdematous neuritis or stauungspapille developing in the course of encephalic affections, but anatomists have declared against this differentiation. Leber, Deutschmann and others have stated that in one case as in the other there are inflammatory lesions of the optic nerve, and that the œdema is not the cause but the result. Elschnig has resumed the study of this question on the basis of pathological anatomy. He describes numerous cases of his own, of which histological examination was made. Unfortunately, while the anatomical study is very complete, the clinical examination is rarely mentioned, and, among ot things, visual acuity is only exceptionally given.

According to Uhthoff, œdematous neuritis may be differentia from descending neuritis with the ophthalmoscope by the mark projection of the papilla (producing a difference of level betw the disc and the retina of at least 2 to 3 dioptres). The stauun papille is then only a particular form of intraocular neuritis, a the venous stasis is but the result of the inflammation of the di In the cases where Elschnig was able to follow the development the œdematous neuritis, either in the course of cerebral tumors or encephalic inflammations, he was never able to find pure œdema the papilla without concomitant inflammatory lesions. Elsch first describes fifteen cases of intra-cranial tumors. In thirteen these there was symmetrical œdematous neuritis; in two there simple intra-ocular neuritis in one eye and œdematous neuritis in other. In twelve cases the œdematous neuritis persisted till dea In one case intense neuro-retinitis (participation of the retina in inflammatory process), and then atrophy of the disc and ret followed œdematous neuritis. In five cases of cerebral tum alterations of the retina and yellow placques near the macula w seen in the course of the neuritis. In six cases the œdemat neuritis was slightly advanced, while the atrophic process was m marked. Histological examination of these twenty-eight cases œdematous neuritis proved that there was chronic inflammation the papilla in all. The projection of the disc is produced inflammatory œdema of the disc and protrusion of the parts of optic nerve situated in the sclero-choroidal canal. The pro inflammatory lesions are situated in the connective tissue of papilla, in the lamina cribrosa and in the perivascular spaces. Th are numerous nuclei in these regions, and round cells in the spa In some parts groups of endothelial cells, resembling giant ce are found. The chronic character of the inflammation is sh by very decided proliferation of the tissues. The vascular walls thickened. New vascular formations are seen around the sn vessels.

The interstitial tissue of the papilla is thickened and the ne fibres are separated by connective tissue plates, which may ever traversed by vessels. The neuroglia tissue of the deeper portion the papilla contains a greater number of nuclei, and also pres spaces which are empty, or filled with albuminoid exudates.

neuroglia cells are in course of proliferation and round and fusiform cells are also found. The nerve tissue only shows secondary alterations (sclerosis, varicose hypertrophy, and wallerian degeneration); these alterations are variable in intensity and irregularly distributed. Hyaline concretions are also frequently found, similar to those which may be encountered in the nerve tissue of the centres. The papillary projection causes a protrusion of the neighboring parts of the retina, sometimes even a partial detachment. This detachment is shown with the ophthalmoscope by the striated appearance of the parts near the disc. The different layers of the retina participate in the inflammatory process of the papilla, but it is often difficult to determine whether these are true inflammatory lesions or degenerative changes. At times there are alterations of the retina at some distance from the papilla. The only anatomical distinction between œdematous neuritis and neuro-retinitis is in the degree of the retinal changes. The choroid is also affected in two-thirds of the cases. Elschnig finds diffuse or circumscribed infiltrations of round cells. The stroma and the vascular walls are thickened.

The papillary atrophy which may succeed the œdematous neuritis is characterised, histologically, by a fibrous transformation of the papillary tissue which still contains numerous nuclei. The vascular walls are thickened, causing partial or complete obliteration. The retina is degenerated in the parts around the papilla.

Among the thirteen cases presenting similar bilateral lesions, Elschnig found in eight an ampullar dilatation of the sheath of the optic nerve on both sides. This dilatation existed on only one side in but one case. Between the sheath and the optic nerve there was always a space filled with an albuminous coagulum, while in the normal condition (the arachnoidal fluid containing but little albuminoid material) this coagulum does not exist. The arachnoid is thickened and adherent to the dura mater. The pial sheath as well as the arachnoid contains groups of round cells. The perineuritis is especially marked in the orbital canal, but less so in the intra-cranial portion of the nerve and in the chiasm. Elschnig has never found simple hydropsia of the sheath of the optic nerve without inflammatory lesions of the sheath.

The optic nerve always presents changes consisting of chronic interstitial neuritis leading to thickening of the septa and, secondarily, to partial and circumscribed atrophy of the nerve fibres.

The intra-cranial portion of the optic nerve is always less affected by these lesions.

Elschnig then describes three *cases of encephalic tumors wi intra-ocular neuritis.* In these three cases the histological lesions the papilla, of the optic nerve, and of its sheaths only differed fr those described above by the absence of œdema.

In three other patients with cerebral tumors the papilla was normal appearance. Ophthalmoscopic examination did not show t least trace of vascular stasis or papillary alteration. Anatomi examination showed that in one case there was ampullar dilatati of the juxtabulbar portion of the optic nerve and in two cases the was interstitial neuritis throughout almost the entire extent of t optic nerve. In a single case the optic nerve showed no alteration

Reasoning from these cases and from anatomical study Elschn concludes that the œdematous neuritis of encephalic tumors is inflammation of the papilla accompanied with very marked œdema

It is always accompanied with inflammatory alterations of the opt nerve and its sheaths and frequently also with similar lesions in tl choroid and retina. The papillitis would seem to be the result propagation of the inflammation by the circumvascular portions the optic nerve.

In a second chapter of his memoir Elschnig gives the results of h study of a number of cases of *intra-cranial inflammatory processe* These observations include seven cases of double œdematous neuriti one of partial atrophy of the papilla following œdematous neuriti ten cases of simple optic neuritis, and ten of normal papilla. In tv of these cases there was a solitary cerebral tubercle with acute tube cular meningitis, and in one a solitary tubercle unaccompanied l meningitis.

From the histological as well as from the ophthalmoscopic stan point, the œdematous neuritis or the simple neuritis, observed in tl course of inflammatory processes, does not differ from that observ in intra-cranial tumors. Elschnig has never seen papillary œden as a single lesion. In tubercular meningitis it is rare to find milia tubercles beyond the optic canal. It is exceptional to find them the trunk of the optic nerve. The ampullar dilatation of the shea of the optic nerve is somewhat less frequent than with intra-crani tumors.

The author then passes to the interpretation of these facts and tl pathogenesis of œdematous neuritis. He reviews the different th ories given, and concludes that the neuritis is of inflammatory origi that there is no essential difference between the intra-ocular neurit and the papillary stasis, and that we do not know why papillary œdema occurs in some cases and not in others. A conclusion of far more importance, which the author does not state, but which follows from his article, is that pathological anatomy alone is incapable of giving a pathogenic interpretation of œdematous neuritis, and that it is very probable that what may be identified in the name of pathological histology is very different, when considered from an etiological standpoint.

No. III.

I.—Pathological Anatomy of Central Cataract and Perinuclear Cataract, by Dr. Eug. von Hippel.

Histological study of four lenses taken from a mother and her child, both of whom had been affected with cataract from infancy.

II.—On the Presence of Peculiar Homogeneous Concretions with Amyloid Reaction in Corneal Cicatrices, by Dr. E. von Hippel.

III.—The Histological Process of Cicatrisation of Perforating Wounds of the Sclera, by Dr. E. Franke.

IV.—The Nerves of the Lids and the Sclera in Man and in the Rabbit from Investigations Made by the Golgi-Cajal Method, by Dr. L. Bach.

Bach has undertaken the ophthalmic study of the nerve ramifications of the lid by the Golgi-Cajal method, and has reached conclusions identical to those of Dogiel, who employed the method of Ehrlich with methyl blue.

The human lid contains many nerve fibres, and there is a rich nerve plexus in the conjunctiva and the tarsus. In some places this plexus forms knots where the fibres are denser and more closely arranged. A tarsal plexus may be distinguished traversing the tarsus in the upper portion of the Meibomian glands. The intraglandular plexus is directly related to this plexus from which it emanates. These nerve filaments surround the glandular lobules, and send nerve ramifications to them. In the tarsal conjunctiva the nerves also form a plexus, which is especially developed at a point corresponding to the superior limit of the Meibomian glands.

V.—The Structure of the Nerve Cell of the Retina in the Normal and Patholigical Condition of the Human Retina; from Investigations made with the Golgi-Cajal Method, by Dr. L. Bach.

On applying the methods of Nissl and von Lenhossék to the histological study of the nerve cells of the retina, Bach has not

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Reasoning from these cases and from anatomical study Elschn concludes that the œdematous neuritis of encephalic tumors is inflammation of the papilla accompanied with very marked œdema

It is always accompanied with inflammatory alterations of the opt nerve and its sheaths and frequently also with similar lesions in t choroid and retina. The papillitis would seem to be the result propagation of the inflammation by the circumvascular portions the optic nerve.

In a second chapter of his memoir Elschnig gives the results of h study of a number of cases of *intra-cranial inflammatory processe* These observations include seven cases of double œdematous neuriti one of partial atrophy of the papilla following œdematous neuriti ten cases of simple optic neuritis, and ten of normal papilla. In t of these cases there was a solitary cerebral tubercle with acute tub cular meningitis, and in one a solitary tubercle unaccompanied meningitis.

From the histological as well as from the ophthalmoscopic stan point, the œdematous neuritis or the simple neuritis, observed in t course of inflammatory processes, does not differ from that observ in intra-cranial tumors. Elschnig has never seen papillary œde as a single lesion. In tubercular meningitis it is rare to find milia tubercles beyond the optic canal. It is exceptional to find them the trunk of the optic nerve. The ampullar dilatation of the shea of the optic nerve is somewhat less frequent than with intra-crani tumors.

The author then passes to the interpretation of these facts and t pathogenesis of œdematous neuritis. He reviews the different th ories given, and concludes that the neuritis is of inflammatory origi that there is no essential difference between the intra-ocular neurit and the papillary stasis, and that we do not know why papillary œdema occurs in some cases and not in others. A conclusion of far more importance, which the author does not state, but which follows from his article, is that pathological anatomy alone is incapable of giving a pathogenic interpretation of œdematous neuritis, and that it is very probable that what may be identified in the name of pathological histology is very different, when considered from an etiological standpoint.

No. III.

I.–Pathological Anatomy of Central Cataract and Perinuclear Cataract, by Dr. Eug. von Hippel.

Histological study of four lenses taken from a mother and her child, both of whom had been affected with cataract from infancy.

II.–On the Presence of Peculiar Homogeneous Concretions with Amyloid Reaction in Corneal Cicatrices, by Dr. E. von Hippel.

III.–The Histological Process of Cicatrisation of Perforating Wounds of the Sclera, by Dr. E. Franke.

IV.–The Nerves of the Lids and the Sclera in Man and in the Rabbit from Investigations Made by the Golgi-Cajal Method, by Dr. L. Bach.

Bach has undertaken the ophthalmic study of the nerve ramifications of the lid by the Golgi-Cajal method, and has reached conclusions identical to those of Dogiel, who employed the method of Ehrlich with methyl blue.

The human lid contains many nerve fibres, and there is a rich nerve plexus in the conjunctiva and the tarsus. In some places this plexus forms knots where the fibres are denser and more closely arranged. A tarsal plexus may be distinguished traversing the tarsus in the upper portion of the Meibomian glands. The intra-glandular plexus is directly related to this plexus from which it emanates. These nerve filaments surround the glandular lobules, and send nerve ramifications to them. In the tarsal conjunctiva the nerves also form a plexus, which is especially developed at a point corresponding to the superior limit of the Meibomian glands.

V.–The Structure of the Nerve Cell of the Retina in the Normal and Patholigical Condition of the Human Retina; from Investigations made with the Golgi-Cajal Method, by Dr. L. Bach.

On applying the methods of Nissl and von Lenhossék to the histological study of the nerve cells of the retina, Bach has not found the fibrillar arrangement of the protoplasm which has been attributed to the nerve cells.

The histological investigations which he has made of the human retina have shown that it does not differ from the descriptions given by Ramon y Cajal and others of the retinæ of mammifera.

VI.—Structure of the Retina of Mamifera from Preparations made with Salts of Silver, by Dr. F. Hosch.

Description of the retina identical to that which has long been known from the publications of Ramon y Cajal, Van Gehuchten, etc.

VII.—Contribution to the Study of Leukæmic Affections of the Eye, by Dr. Rosa Kerschbaumer.

Observations of ocular lesions dependent upon leukæmia are not numerous. The author gives a bibliographic review of published cases, and then passes through the clinical and anatomical description of a patient observed by herself.

This was a man twenty-five years old, in whom bilateral exophthalmus and diplopia had existed for two months. His general condition had changed several months before. His appetite had disappeared ; his strength had diminished, and the patient felt pain in the extremities.

On his entrance to the hospital there was found to be generalised painless adenopathy. The ganglia in the neck formed large tumors. The liver and the spleen were hypertrophied. The blood contained a greater number of leucocytes than in the normal condition. No albuminuria. Very marked irreducible exophthalmus with considerable limitation of the movements of the eyeball. The conjunctiva was injected and presented small papillary hemorrhages. Visual acuity was reduced in both eyes (¼ in the left, ½ in the right). The disc of the left eye presented the characteristic of œdematous neuritis. In the right eye there was only a slight degree of venous stasis.

The patient died two weeks after his entrance.

Anatomical study revealed an infiltration of both orbits with a new-formed tissue of soft consistency, elastic, reddish yellow in color, filling the entire orbital space occupied normally by adipose tissue and embracing the muscles, the optic nerve and the posterior portion of the eyeball. The bulbar conjunctiva was invaded and thickened. The choroid was infiltrated and its thickness increased from the periphery to the central regions. The subjacent layers of the sclera were also involved. The retina was slightly altered; the layer of visual cells showing some cellular infiltrations, but the other layers were intact. The optic nerve only presented a slight degree of papillitis, the sheaths, on the other hand, were decidedly infiltrated and almost confused with the mass of orbital new formation.

This infiltration was quite uniform and in some places presented fibrous areas. It was formed of soft and polynuclear leucocytes, a certain number of which had undergone fatty degeneration. In some spots giant cells were found.

The author found an encapsulated bacillus in the infiltrated orbital tissue, in the vessels and in other organs, which took Gram's stain and resembled the bacillus of rhinoscleroma. There were also groups of cocci in the spleen and in the ganglia. But these facts were only discovered on specimens obtained twenty-four hours after death, and no cultures were made. The other organs presented the typical lesions of leukæmia.

Histological examination proved that the infiltrations started around the blood vessels.

VIII.—The Neuropathic Nature of Nystagmus, by Dr. ALFRED GRÆFE.

Two types of nystagmus are distinguished—congenital and acquired. It is stated that these two types have a very different etiology. All cases of congenital nystagmus with rare exceptions are accompanied with anomalies of vision, so that this type might be designated by the term "optical nystagmus." In acquired nystagmus the visual disturbance, if it exists, has no causal importance, and the origin of the nystagmus is always neuropathic. In an important article, Raehlmann has endeavored to show that this essential distinction has no reason for existence. In his opinion, the visual disturbance and the nystagmus which are observed in congenital nystagmus are two independent manifestations of a single neuropathic affection. Congenital or acquired nystagmus is always then a neurosis.

According to Græfe, the development of nystagmus is related to a disturbance of the retinal functions at a time when the latter should preside over the education of the cortical motor centres, which command and regulate the movements of fixation of the eyeball. From this point of view, nystagmus may be considered as a neurosis; but Græfe does not consider, as Raehlmann does, that the centre nerve alteration is primary. Furthermore, in miner's nystagmus, it is the visual effort, resulting from absence of light and ill-defined retinal images, which plays the greatest rôle in the development of this anomaly.

Græfe remarks that in miners a visual vertigo is frequently observed, resulting from apparent displacement of objects from the oscillations of the eyeballs. In congenital nystagmus this apparent displacement does not occur, and binocular fusion is perfectly normal.

IX.—**Vision in Myopia,** by Dr. H. TRIEPEL.

X.—**A Case of Graves' Disease, with Monocular Exophthalmus and Unilateral Hyperatrophy of the Thyroid Gland,** by Dr. PERCY FIRDENBERG.

This patient, twenty-four years old, had exophthalmus on the left side only, and the hypertrophy of the thyroid only affected the right lobe.

XI.—**Contribution to the Study of Tumors of the Lids,** by Dr. BECKER.

Becker describes a tumor of the upper lid, observed in a man fifty-four years old. This tumor had developed for three years. It occupied the entire upper lid, was adherent to the skin, and did not involve the conjunctiva.

Histological examination showed that it was formed of connective tissue traversed by numerous lacunæ and containing no blood globules. The author thinks that the lesion was of the character of elephantiasis, as total ablation of the tumor was not followed by recurrence.

XII.—**A Case of Sub-Conjunctival Angioma,** by Drs. D. BOSSALINO and HALLAUER.

A young man, seventeen years old, who for five years had a small tumor of dark color, the size of a bean, situated on the bulbar conjunctiva on the nasal side. This tumor caused no functional disturbance. Histological examinations showed that it was a cavernous angioma of muscular origin, which had developed on the internal rectus muscle.

XIII.—**On Capsular Detachments,** by Dr. TOPOLANSKI.

Under this name Topolanski describes all cases where the capsule is not in direct contact with the lens fibres, either on account of a fluid or solid exudate.

He recognizes congenital capsular detachment (those seen in cases of coloboma of the lens).

Among acquired capsular detachments may be seen those situated in eccentric parts without alteration of the lens or accompanied with opacities of this body.

A capsular detachment may again be observed when, as a result of a pathological process in the eyeball, the lens is retracted and the capsule remains adherent by a point to the iris.

When the cause of the detachment is a cicatrix in the capsule it assumes a peculiar form and a series of folds are seen converging towards the central cicatrical point.

XIV.—On Filtration in the Anterior Chamber in Normal or Glaucomatous Eyes, by Drs. CH. F. BENTZEN and TH. LEBER.

Leber has demonstrated that there is filtration of the aqueous humor through the meshes of the spaces of Fontana. Knies and Ad. Weber have endeavored from this fact to explain glaucoma by an obstacle to filtration resulting from adhesion of the periphery of the iris through the border of the cornea.

But this theory, in spite of the support given it by the investigations of Priestley Smith, has not been clearly demonstrated. It has been found, in fact, that the arrangement of the irido-corneal angle was perhaps only the result of increase of tension, and that the irido-corneal angle was not always destroyed, in spite of hypertonia. It is easily seen that anatomical investigation is not sufficient to solve this problem.

Leber has carried on a comparative study of the filtration in the anterior chamber in normal and glaucomatous human eyes immediately after enucleation.

The experiments were made on three normal eyes. The average amount of filtration of a physiological condition of chloride of sodium was about 5 c. c. per minute, the pressure remaining constant (25 millimetres of mercury), while the filtration of a solution of Prussian blue, under similar conditions, was 2 c. c. per minute.

In an eye with purulent cyclitis with normal tension, the filtration experiments gave almost the same result.

In four cases of primary glaucoma, there was found to be a very decided diminution of filtration in the anterior chamber, and the amount, compared with that of the normal eye, was always in the proportion of 1 to 10, or to 5. Furthermore, the diminution of filtration in a glaucomatous eye is again shown by the fact that such eyes preserve their hardness for several hours after enucleation.

In two eyes with anterior hydrophthalmus the filtration was very much diminished, although properly speaking, the irido-corn angle still existed, a fact which proves that histological examinati of this region is very frequently not sufficient to account for t obstacle to filtration.

In six cases of secondary glaucoma experiments again demonstrat the diminution of filtration.

From all these experiments it will be seen that in primary gl coma (acute or chronic) as well as in anterior hydrophthalmus a secondary glaucoma, there may be a diminution in the power of tration in the anterior chamber in relation to the normal eye. T cause of the obstacle to filtration is most frequently the effaceme of the irido-corneal angle from adhesion of the iris to the corn When this lesion does not exist as in hydrophthalmus, the cause the obstacle remains to be proven.

These facts seem to support the theory of glaucoma by retenti but the number of cases examined is not yet sufficient to draw defin conclusions.

XV.—A New Linear Form of Stenopeic Spectacles,
by Dr. **Hensen**.

Stenopeic spectacles cannot be practically utilised, because orifice is too small, and too great a quantity of light and extent visual field are lost. Good practical results may, however, be obtai in certain cases of astigmatism by making a vertical linear slit 2 n limetres long, having in its middle part an opening formed like pupil of carnivera, and the greatest width of which is 1, 2 mm.

Klinische Monatsblaetter für Augenheilkunde

Reviewed by Dr. V. Morax.

I.—Retinitis Punctata Albescens, by Dr. Liebrecht.

This white punctate retinitis is characterised, according to Fuc by the presence of small white or yellow spots, without pigment the border, and quite regularly arranged. They are never con ent. Sometimes there are no spots on the macula. This affect is seen in young persons and in several members of the same fam Twice consanguinity of the parents was established. The patie have diminution of vision, concentric narrowing of the visual fi and hemeralopia. The affection is congenital, or at least develops in infancy.

Liebrecht reports the observation of four persons of the same family (two brothers and two sisters) affected with this disease. A third sister had no disturbance of vision. There was no consanguinity. The parents had no ocular disturbances. With all these patients the affection presented the same characteristics, and the ophthalmoscopic examination corresponded exactly to Fuchs' description.

It is only after the fifteenth or sixteenth year that vision is diminished, and hemeralopia does not commence until later. At present the patients count fingers at 4 metres. No syphilitic history could be found. In two ese patients there were, at first, lesions of the pigment epithelium and striæ of pigmentation which have since disappeared. In a third the spots have never presented pigmentation.

The retinal lesions seem to have been the result of chorio-retinitis. No anatomical study of this affection has yet been made.

II.—**On the Vision of Colored Spots,** by Dr. HERTER.

Herter describes the case of a colleague who, for quarter of an hour, during several consecutive days, perceived a colored scotoma.

III.—**Sympathetic Disseminated Choroiditis,** by Dr. CASPAR.

A boy, nine and one-half years old, who, when six years of age, received a penetrating injury to the left eyeball. Enucleation a short time after, on account of inflammation in the right eye. This inflammation disappeared, leaving only a weakness of vision. There are now pigment deposits on the lens capsule. The borders of the papilla are somewhat hazy. The retina is scattered over with yellowish white spots, without pigment deposits, except at the macula and in the immediate neighborhood of the papilla. There are also other spots at some distance from the papilla, forming reddish yellow striæ, not limited, and containing pigment masses in their central part. No alteration of the vessels. $V = \frac{5}{6}$. This case, according to Caspar, is similar to that described by Hirschberg (1).

IV.—**Ophthalmia Caused by a Caterpillar's Hair,**
by Dr. ELSCHNIG.

A girl, fourteen years old, got a hair from a caterpillar in her eye. Immediately afterward there was severe pain in the eye, and then marked inflammation of the conjunctiva and the cornea, v lasted for fifteen days. The affection was not accompanied by le of the iris or the ciliary region, as in the cases described by P stecher, Hilleman, and Störmann.

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(1) See *Annales d'Oculistique* April, 1895.

V.—**Actinomyces in the Lachrymal Canal,** by Dr. ELSCHN

In a patient seventy years old, presenting an obstruction c inferior lachrymal canal with inflammation of the canaliculus, inc of the canal gave vent to secretions which, examined microscopi showed radiate filaments of round form, but no club-shaped Efforts to cultivate were negative. Elschnig thinks that it actinomyces ?

July.

I.—**A New Syringe and its Importance in Ophthalmolog Practise,** by Dr. ZIEM.

It is a small hand syringe which the author recommends for and conjunctival irrigation.

II.—**Glaucoma Following a Cataract Operation,** by Dr. ELSC

A patient of seventy-three years, with arterio-sclerosis, prese both eyes, after the extraction of cataracts and without septic com tion of any kind, glaucomatous symptoms, developing after the ty chronic inflammatory glaucoma. The author says that before o tion the eyes presented no pathological trouble except the opaci the lens, and that the instillation of mydriatics had not prov the increase of tension. The symptoms of glaucoma developed th six hours after the operation, despite a regular iridectomy and out any instillation of atropine. There were neither cortical m nor capsular contraction present. Elschnig thinks that it was secondary glaucoma, but believes that the operative interference only the cause of the onset of glaucoma in a person predisposed

III.—**Lenticonus Posterior,** by Dr. ELSCHNIG.

Unilateral lenticonus posterior in a girl of seventeen y Ophthalmoscopic examination shows a myopia of 30 D in the t parent central parts, while the periphery presents a hypermet of 4 D. There is a slight posterior polar opacity. The affe eye is markedly amblyopic, while the other is emmetropic. affection is congenital.

August.

I.—**Operation for Secondary Cataract,** by Dr. ELSBERG.

Elsberg recommends for operation for secondary cataract the of small scissors, introduced transversely through a sclero-corneal incision made with the knife. This allows one to avoid pulling upon the ciliary region. With it he has obtained very good results.

II.—**Two Interesting Tumors of the Eye of Traumatic Origin,** by Dr. PFINGST.

The first case is an epibulbar melanosarcoma of the sclero-corneal junction, developed in a man of fifty, some seven months after a traumatism which had affected the point where the tumor afterward appeared.

The second observation relates to a sarcoma of the lachrymal gland. The patient, aged fifty-four years, received an injury from a bit of wood at the level of the orbital border of the right side. The traumatism produced no solution of continuity, but the spot remained painful, and some months afterward the patient noticed the development of a tumor at the site of the contusion. The tumor was removed, and microscopic examination showed a round-celled sarcoma.

III.—**Prisms and Simulated Unilateral Amaurosis,** by Dr. FRÖHLICH.

Fröhlich recommends the use of prisms of iceland spar, which give rise to two images, consequently to binocular triplopia, and thus baffle dissimulation.

IV.—**A Case of Primary Fibro-Sarcoma of the Optic Nerve,** by Dr. E. WIEGMANN.

A girl at five years has, for seven months, had a very marked exophthalmus of the left eye without impairment of vision. The papilla is a little pale and prominent, but its contours are distinct. After enucleation of the globe, we find a pyriform tumor extending from the bulk to the fundus of the orbit, corresponding to the optic nerve. This tumor is extirpated. Histological examination shows that the tumor is surrounded by a fibrous wall, corresponding to the sheath of dura mater of the optic nerve, and of normal thickness and structure. This sheath is in direct contact with the neoplastic tissue which appeared to form two distinct parts, one peripheral, corresponding to the perineurliem, the other central, corresponding to the optic nerve proper, and traversed by the separated optic fibres. The neoplastic tissue is formed of bundles of connective tissue with numerous connective tissue cells. The point of origin of the tumor appears to be the pial sheath of the optic nerve. Six months after operation, the neoplasm had not returned.

V.—Foreign Body Fixed for a Year and a Half in the Corne

by Dr. R. Hilbert.

A small elytrum of an insect had been fixed for a year and a h in the cornea without exciting any subjective reactionary sympton

September.

I.—On Some Subjective Visual Perceptions; Perception the Capillary Circulation of His Own Eye, by Dr. v Zehender. (To Follow.)

II.—On the Experimental Production of Embolism of tl Intra-Ocular Vessels, by Dr. Herrnheiser.

The author employed a syringe permitting the injection of ve small quantities of liquid. For material to inject he gives the pr erence to pigments in oil. The injection is made into the interr carotid, and it is necessary only to introduce small quantities a nu ber of times. In the rabbit the undertaking is almost always succe ful, and it is easy, with the aid of the ophthalmoscope, to follow t evolution of the lesions. When an embolism is produced one notic at once a pupillary contraction and some lachrymation in the affect eye.

Herrnheiser will later publish a study of the lesions thus produce

III.—Physiological Observations; Accommodation of tl Amaurotic Eye, by Dr. R. Greeff.

In a boy of seven years, emmetropic, one of whose eyes w amaurotic as the result of a tumor of the optic nerve, Greeff h noticed by keratoscopy that fixation of an object at 25 cm. render both eyes myopic by—4 D. In other words, accommodation w exactly equal in the amaurotic and in the sound eye. This obser tion proves that accomodation is symmetrical, even when this musc lar contraction is of no utility.

IV.—A Case of Gummous Lesion of the Orbit, the Midd Cerebral Fossa, and the Brain, with Autopsy, by Dr. E. Bless

A man, aged thirty years, had had gummous cutaneous ulceratio at the margin of the nose, and one year later symptoms of orbi tumor appeared (exophthalmos, immobility of the globe, and pai with neuro-paralytic keratitis of the same side. Vision, at first p served, rapidly failed. Evisceration of the eye was then practis because of the violent pains, and, in the cellular tissue and witho connection with the optic nerve or the eyeball, a hard tumor of t size of a hazel-nut was then found. The centre of the tumor w caseous. During the operation anæsthesia with complete analge of the orbit was noted. Microscopic examination of the tumor showed it to be a gumma. One month after the operation, pain developed in the opposite orbit and ophthalmoscopic examination revealed an œdematous neuritis. The patient also suffered from mental disturbance, somnolence and rigidity of the neck, and death ensued in coma. At the autopsy there was found a whitish mass resembling the cerebral substance, filling the middle cerebral fossa, and the sella turcica, surrounding the ophthalmic artery and the right half of the chiasm, and invading the anterior part of the temporal bone and the inferior surface of the right temporal lobe. The tumor was hard in some parts; soft in others. The liver presented the lesions of gummous interstitial hepatitis.

October.

I.—On Some Subjective Visual Perceptions; Perception of the Capillary Circulation of His Own Eye, by Dr. VON ZEHENDER.

Steinbach, Vierordt, and Purkinge have described the phenomenon and the manner of eliciting it. For this purpose, it suffices to exert gentle pressure upon the eyeball through the upper lid and to fixate a white surface. There then appears a network formed of a series of round grains, transparent and placed near one another as if in a chaplet. The grains appear round; their periphery is dark; the centre clearer. The lines of the network, formed by the juxtaposition of these grains, have various directions. They are seen only in the part of the visual field adjoining the optic axis. The grains, as they are seen, are animated by a continuous movement, but the lines always preserve the same direction. There is never any modification in the direction of movement. According to Steinbach, this movement is synchronous with the arterial pulsations. One sees the image of the network only during the cardiac diastole; it disappears during systole. Von Zehender has not noted the disappearance of the image during systole, and the movement of the globules appeared to him constant with periods of acceleration and retardation.

Steinbach declares that in the network we see only vessels which enclose single globules in their lumen. Zehender has always seen two or three globules abreast. Vierordt, returning to the study of the phenomena, insists upon the difference which there is between the phenomenon of Purkinge and the perception, properly speaking, of the circulation. In the first case the macula appears sharply defined from the neighboring parts of the retina, and only above it do we distinguish the vessels. In the second case, on the contrary, the macular region is not deprived of its vessels, the network is only a little less distinct. Von Zehender easily succeeded in the undertaking without exerting pressure upon the eyeball. For him it sufficed to fix a point upon a sheet of white paper. In what vessels do the circulatory movements which we see occur? Is it in the retinal vessels, or in the capillaries of the choroid? All the authors believe that it is in the retinal capillaries. For H. Müller and Vierordt, the vessels perceived in the phenomenon in question are different from those seen in the phenomenon of Purkinge, but the authors do not define the difference; Vierordt, however, is inclined to think that the choroidal vessels are concerned. Zehender believes that it is the network of the choroidal capillaries which is perceived. To this the objection may be urged that that network lies behind the sensitive layer of the retina, and that, in consequence, it cannot be perceived; but in the opinion of Zehender, in the phenomena studied, the perception is not of a shadow but, on the contrary, a luminous perception. If, he says, it were the shadow of a vessel, we ought to distinguish the wall of the vessel, as well as the blood corpuscles contained in it.

If we had to do with the capillaries of the retina, there should be about the macular region a gap in the network as it shows in the artificial injection of the retinal vessels. But this gap does not exist.

Zehender believes that under the influence of objective light there occurs a peculiar process in the pigment layer of the retina, the rods and cones being influenced only secondarily. Accepting this hypothesis, we can easily understand that the rods and cones can receive impressions not only from the objective light but also from impulses coming from behind. We can, indeed, admit that certain chronic processes which occur in the pigment cells can produce a luminous excitation of the rods and cones, and the perception of things situated behind the retina no longer appears absurd.

II.—**Physiological Observations, Considerations on Binocular Vision in Cases of Strabismus, and upon the Role of the Lens in Myopia,** by Dr. R. Greeff.

We can observe, in very rare cases it is true, strabismics who, after an operation for squint, can not only learn to unite the stereoscopic images, but also meet the test of Hering's experiment. These strabismics at first commence with having stereoscopic vision, but before long they come to have the perception of depth. The development of vision follows the course described by Schmidt-Rimpler.

1. Double vision in the stereoscope;
2. Simple binocular vision in the stereoscope;
3. Perception of perspective in the stereoscope;
4. Success in Hering's experiment.

Greeff reports a case where the development of vision varied from the ordinary course. After the operation the patient had the perception of perspective when she was not able to fuse the stereoscopic images.

A girl, of 19 years, had complained for some time of experiencing trouble with vision while working. At rest the eyes have normal relations, but if convergence is elicited, a slight divergent strabismus of 2 to 3 millimetres is produced. With the colored glass a homonymous diplopia is determined. The patient is emmetropic, and vision normal.

Before as well as after operation (tenotomy of the right externus) the patient perceived but one field in the stereoscope. It was impossible to excite in her perception of relief in the stereoscope. On the other hand, with Hering's apparatus, it was shown that the patient had perfect perception of perspective.

(We may remark that this observation holds good in the cases of convergence due to paralysis or contraction, studied by Dr. Parinaud, which are always of a neuropathic nature. We can compare these cases to concomitant strabismus, not so much from the point of view of functional affections as on that of therapeutic interference.) French Edition.

(An acceptance by our transatlantic friends of the facts of variations in the vertical tensions would lead to a different interpretation of these phenomena.)—G. T. S.

The operative treatment of myopia has shown that the lens has not the same dioptric value in emmetropia and in myopia. According to the observations made by Hori at Schweigger's clinic, the average dioptric value of the lens was 18 D; but there are individual differences, and one cannot foresee exactly the amount of correction. In studying the high degrees of myopia, we find side by side with the cases where the extent of staphyloma is proportionate to the degree of myopia other cases where with M = 20 D there is no posterior staphyloma.

Greeff reports some observations where aggravated myopia affected only one eye, and was developed without hereditary mypoic antecedents. He suggests that in these cases the myopia is due to the lens.

III.—Treatment of Conjunctival Catarrh, by Dr. A. Peters.

For the treatment of conjunctional catarrh and phlyctenular affections of the cornea and conjunctiva, Peters recommends the use of the following ointment :

Ichthyol ammoniacal	0.02 — 0.05 centigrammes.
Amidon	10 grammes.
Zinci oxidi....................	10 "
Vaselini	25 "

This ointment is not irritating ; applied to impetiginous cutaneous lesions, it gives good results.

November.

I.—On some Subjective Visual Perceptions; on the Subjective Perception of Movements of the Pigment of Pigment Epithelium (Last Article), by Dr. W. von Zehender.

If one fixes his attention upon his visual perceptions when in darkness, the visual field at first appears a uniformly dark surface. Then there may appear upon this dark background a number of small pale blue spots. The spots play more or less upon the background ; they are animated with a movement which may be compared to that of a swarm of ants; the spots do not change their position, but modify their form. They increase or diminish, they fuse or separate, and where a spot vanishes, the dark background reappears. We see, moreover, small shining points, of more or less intense brilliance, which are animated with movement. Their movement is not like that in the circulation of the blood, one of translation, but a sort of vibration; of appearance and disappearance. If the eye remains immobile, we see the circle of fixation become a bluish spot which expands, while the periphery becomes more luminous ; then the phenomenon repeats itself without interruption. But while the circle of fixation maintains always the same brilliance at the periphery, we see the small shining points appear and disappear. One can push the analysis of these subjective phenomena still farther, and von Zehender perceives in the bright spots some small granules, of nearly uniform size, which give the impression of a fine powder. It is this powder which Zehender considers as resulting from the perception of the granules of pigment.

Zehender then sums up the conclusions of the five articles which he has devoted to the study of subjective visual perceptions, thus :—

One can easily see the circulation of the blood in his own eye without artificial aid and without exerting pressure upon the eyeball.

The circulation perceived is not that of the retina, but that of the capillaries of the choroid.

The circulation of the blood is not regular ; slowing and acceleration, even complete arrest and retrograde movement can be observed. The irregularity of movement seems to be influenced by intentional fixation.

The author has never noted synchronism with cardiac activity or the respiratory movements.

The walls of the vessels are not seen ; the blood appears to move through channels without walls.

The shining points, which, with a little attention, can be perceived in full day or in the darkness of night, are the expression of the act of "explosion of cells" (E. Pflüger).

Corroborating the work of eminent physiologists and physicians, the author thinks that the objective light acts primarily upon the pigment, modifying it by photo-chemical action, and secondarily upon the rods and cones, and that the blood can produce analogous phenomena.

The granules of pigment and their movements are subjectively perceptible under certain conditions.

As the result of the movement or displacement of the pigment granules, there sometimes appear regular figures, quadrangular, hexagonal, or polygonal, a fact observed by many experimenters.

These figures (images of parts situated behind the retina) resemble in many ways the images projected by a magic lantern. It is possible that they may be comparable to the vision of animals provided with eyes with facetts. No displacement of the image corresponding to motion of the eyeball can be observed.

II.—On Sub-Conjunctival Injections of Sublimate, by Dr. SEGGEL.

Dr. Seggel relates four cases (infection following an operation for cataract, infection following a penetrating wound of the eyeball, orbital phlegmon, specific iritis) where sub-conjunctival injections of sublimate have given him good results.

III.—The Light Sense in Affections of the Media of the Eye, by Dr. Katz.

When the media of the eye are affected, if the nerve apparatus is normal, the light sense is not changed, but as soon as the nerve apparatus is even the least affected, there is enfeeblement of the light sense.

To assure one's self of the integrity of the light sense in a patient with cataract, for example, we proceed thus:

In a dark room, our eye being covered, a candle A is placed 1 metre from the other eye, then we find at what distance we can station a second candle B so that it may be alternately covered and uncovered without the eye failing to note the changes in illumination. If the eye perceives the changes of light when the candle B is at a distance of 5 metres, the light sense is normal.

IV.—Recovery from Detachment of the Retina, by Dr. Fraenkel.

A man of twenty-seven years presented on the right a retinal separation at the level of the macula, on the left a separation in the inferior segment, central scotoma of the right eye, and slight contraction of the visual field on the left. Left eye $V = \frac{5}{6}$ with—6 D.

Medical treatment (rest in bed, pilocarpine, and compression bandage) continued for a month produced no change. Eleven years afterward, the retina has reapplied itself, but at the points corresponding to the detachments can be seen white atrophic spots with pigmentary deposits. No modification of vision.

December.

I.—Contribution to the Study of the Pathological Anatomy of the Cornea; Vesicular Vascular Keratitis, by Dr. D. Bossalino.

A woman of seventy-two years, for some months had complained of pain in the left eye. She presented an ulceration of the cornea, with a slight hypopyon, some iritis with numerous posterior synechia, and a complete cataract. Under lotions of sublimate and instillations of atropine, the hypopyon diminished. Fifteen days afterward it had disappeared, but in the beginning of November there appeared upon the cornea some small, grayish spots, which appeared to be a vesicular keratitis. These infiltrations multiplied, disappeared at one point only to reappear at another, and were accompanied by very violent pain. At the same time a superficial vascularization of the cornea was seen to develop. The general condition being impaired by the pain and insomnia which resulted, enucleation was practised. Microscopic examination of the cornea showed the presence of small vesicles, raising the corneal epithelium and filled with cellular detritus, red cells and fibrin. Bossalino thinks that these vesicles were caused by the small apoplexies of the new-formed vessels which penetrate the epithelial layers. Three plates in one way show very clearly the corneal lesions, but it is quite evident that this anatomical examination throws no light on the cause of the affection.

II.—Contribution to the Question of Nasal Hemianopsia, by Dr. Rakowicz.

In the present state of our knowledge on the subject of direct and crossed fibres of the optic nerve, can we speak of a nasal hemianopsia? Nasal hemianopsia supposes, in substance, a lesion of the direct fibres of the optic nerve which supply the temporal regions of both retinæ. At what point are these fibres sufficiently isolated to permit of their being affected alone. We suppose ordinarily a lesion symmetrically affecting the two lateral angles of the chiasm. But the researches of Henshen have shown that a lesion of the angle of the chiasm must affect the crossed fibres also. The experimental researches of Rakowicz have led to the same conclusion.

There are cases where, in the absence of any lesion of the papilla, we observe deficiency of the visual field having the appearance of nasal hemianopsia, but this is a purely accidental occurrence.

Rakowicz has observed a patient whose affection belongs in this category of cases. A woman of fifty years presented an absence of perception in the nasal half of both visual fields. In the temporal half white was perceived, but there was some dyschromatopsia for red and green. The pupils reacted poorly. The papilla appeared a little pale, but without definite signs of atrophy. Little by little vision changed and the papilla took on more and more of an atrophic look. Five and a half months later, the amaurosis was complete in one eye, and only an eccentric field of vision persisted in the left eye. In short, it was a case of simple atrophy of the optic nerve, which in the beginning might have been taken for a nasal heminaopsia.

III.—Some Researches on Atropine Conjunctivitis, by Dr. G. Ahlström.

We have thought that atropine conjunctivitis was caused by a microbic contamination of the solution employed, but this supposition has not been confirmed by the facts, and Ahlström has seen an atropine conjunctivitis develop in a patient who was using a callyrium sterilised by boiling. The true cause of this action of atropine upon some conjunctivæ remains altogether unknown.

IV.—Remarks on Accommodation in the Amaurotic and Strabismic Eye, by Dr. Th. Axenfeld.

Corroborating Greeff's communication (1), Axenfeld reports two observations, where, despite amaurosis and divergrat strabismus, accommodation was equal in both eyes. In the first case, the amaurosis had existed for a year and had been caused by an embolism of the central artery; in the second case the amaurosis was due to an artrophy of the optic nerve following a fracture of the skull, and had existed for seven years. Axenfeld has often assured himself of the existence of accommodation and of its functional symmetry in the two eyes in strabismics, even when binocular vision was wanting or when there was a very marked congenital amblyopia present.

V.—Two Interesting Cases of Traumatism, by Dr. Pergens.

Centralblatt für praktische Augenheilkunde

Reviewed by Dr. V. Morax.

April, 1895.

I.—Contribution to the Study of Extraction by the Magnet, by Dr. Purtscher.

Purtscher has tried the extraction of multiple fragments with the electromagnet of Hirschberg in nine cases. In six, the foreign body was extracted. These six cases gave the following results: In two vision was perfectly restored; in three it was very much reduced; in one the eye was lost. From the study of these cases we may conclude that the operation should be undertaken as quickly as possible after the penetration of the foreign body, and that we ought to operate in all cases.

II.—Prophylaxis in Ophthalmia of the New-Born, by Dr. H. Cohn.

Cohn is convinced of the efficacy of Crédè's method. His statistics, with those of Crédè, Haab, and many others, demonstrate it. He does not think that the silver solution can give rise to conjunctional or corneal lesions. It is necessary to use a 2% solution of nitrate of silver.

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(1) *Annales d'Oculistique*, January, 1896.

III.—Keratitis from the Sting of a Wasp, by Dr. PURTSCHER.

A man, twenty-four years of age, stung on the cornea by a wasp twenty-four hours previously. Immediately after the sting, violent pain, radiating into the corresponding half of the face. Twenty-four hours afterward: severe pain, slight tumefaction of the right eyelids; bulbar conjunctiva injected with chemosis in the lower part; corneal affection, with striæ deeper at the centre of the lesion, epithelial erosion with deeply depressed centre. Hypopyon barely 1 millimetre in depth. The eye was sensitive to pressure. The patient has not been seen again.

May.

I.—Function of the Facial in Lachrymal Secretion, by Dr. GOLDZIEHER.

Goldzieher reports a new observation in corroboration of his theory of the function of the facial in lachrymal secretion. The patient is a woman, twenty-one years of age, presenting a left facial paralysis of peripheral nature, in whom the lachrymal secretion is markedly diminished on the paralysed side.

II.—Herpes Frontalis and Neuro-Paralytic Keratitis with Paresis of the Oculo-Motor, by Dr. GINSBERG.

III.——Prophylaxis in Ophthalmia of the New-Born (conclusion), by Dr. COHN.

IV.——Two Modifications of the Operation for Entropion, by Dr. IRON SIKLOSSY.

June.

I.—Is the Left Eye More Exposed than the Right in Miners and Blacksmiths? by Dr. NIEDEN.

In reply to this interesting question statistics give the following figures:

In miners { the left eye has been injured in.. 48.8% of the cases.
the right eye has been injured in.. 51.2% " " "
In blacksmiths { the left eye has been injured in..59.35% of the cases.
the right eye has been injured in 40.65% " " "

II.—Hereditary Retro-Bulbar Optic Neuritis, by Dr. H. A. WESTHOFF.

In a certain family almost all the male members present signs of retro-bulbar optic neuritis, although the female members have no visual trouble. In the course of three generations nine members have been affected.

The trouble consists of a bilateral central scotoma which develops during the period of adolescence and remains stationary or becomes complicated by enfeeblement of the peripheral vision. There is no other trouble and the affection has not been aggravated by consanguinity of the ancestors.

July.

I.—On the Antiseptic Properties of Tears, by Dr. G. Ahlström.

The author collected the secretion of the lachrymal gland from a patient who had a lachrymal fistula following an acute suppurative dacryo-adenitis. To study its bactericidal action, Ahlstrœm inoculated the lachrymal secretion with the staphylococcus pyogenes aureus, and then at varying intervals he proceeded to count the number of germs by the plate method. His experiments show that the tears have no bactericidal property. Bernheim has arrived at a diametrically opposite conclusion, but he collected the lachrymal secretion from a patient with keratitis, as well as from healthy persons, exciting lachrymation with vapors of ammonia.

Ahlstrœm has repeated his experiments under the same conditions as Bernheim. He found that the lachrymal secretion, collected in this way, had a slight bactericidal action. He attributes the difference to the more marked alkalinity of the lachrymal secretion in the case of the lachrymal fistula. The more abundant the tears, the less their alkalinity. In the normal condition, the lachrymal secretion being feebly alkaline, its antiseptic action is nil, or at least insignificant. On the other hand, when the tears are secreted in abundance under the influence of an inflammatory condition, it may be that they exercise a slight bactericidal action. Is it really a bactericidal action? The author thinks that the only rational conclusion to draw from the fact that the staphylococcus does not multiply in the lachrymal secretion is that this liquid forms a poor culture medium.

II.—On the Operation for Trichiasis, by Dr. Thier.

The author describes his operation for trichiasis, which resembles that of Spencer Watson. The palpebral margin is incised longitudinally, and divided into two leaves; a narrow slip of skin is then dissected up from the upper eyelid, completely freed, and transplanted between the leaves of the palpebral margin. The sutures are put in place before the introduction of the transplanted flap; they reunite the edges of the two leaves and the skin flap is insinuated behind them. This procedure has given him very good results.

August.

I.—Fragments of Steel in the Vitreous, by Dr. ROSENMEYER.

The interest of this case lies in the fact that by the aid of the ophthalmoscope it was possible to obtain evidence of the change of direction which the foreign body has undergone within the globe. After being penetrated obliquely through the cornea near the centre, it perforated the iris, passed between the lens and the ciliary body, and then struck the retina a little behind the ciliary processes. Thence it rebounded from behind to the centre of the vitreous where it was easily seen. At the point where it struck the retina, or rebounded from it, a small, very localised hemorrhage can be seen. The patient counts the fingers at 4 metres. The foreign body was removed with a magnet, and seventeen days after operation vision had increased to ½.

II.—Treatment of Acuté and Chronic Dacryocystitis by Rhinalgine, by Dr. THORNALLA.

A violent coryza is frequently accompanied by a more or less intense conjunctivitis. The inflammation of the nasal mucosa extends to the mucosa of the nasal duct and to the conjunctiva. The conjunctival catarrh may disappear with the coryza or may continue chronic, requiring catheterisation. Thornalla has produced good results upon the coryza and conjunctivitis by the introduction into the nares of suppositories of rhinalgine.

Cocoa butter....................	1 gramme.
Alumnol	0.01 centigr.
Olie Valerianæ..................	0.025 milligr.
Menthol......................	0.025 —

For a suppository. The suppository is placed in the nostril, the patient lying down during the time necessary for its liquefaction.

III.—Diphtheritic Conjunctivitis Treated by the Antitoxin of Behring, by Dr. RECKEN.

An infant of a year and a half presented a pseudo-membranous exudate upon the conjunctiva, and a marked tumefaction of the lids of the right eye with a parenchymatous affection of the cornea. The source of this diphtheritic conjunctivitis was easily determined, as the mother of the child had fifteen days before had scarlatina with diphtheritic pharyngitis. The treatment of the diphtheritic conjunctivitis consisted for the first three days in lotions of sublimate (1 to 1000) applications of sublimated vaseline and hot compresses. During this treatment, which produced no improvement, the left eye became affected, the cornea of the right eye ulcerated. It was only four days after beginning treatment that it was decided to give an injection of Behring's antitoxin Recken was unable to observe any modification of either general or local condition, which for ten or twelve days remained the same, recovery then taking place.

The ulceration of the cornea left a leucoma of 2 millimetres extent, but the author thinks that, considering the gravity of the affection, the result is altogether remarkable. Recken has no knowledge of other cases where the antitoxin has been employed, and thinks that his observation is the first published.

Happily, there are many more complete and better studied, for the absence of bacteriological diagnosis and the indefinite action of the serum deprive his case of all value.

The reading of *Annales d'Oculistique* should have made him familiar with the numerous publications previous to his own.

IV.—BOOK NOTICES

BOOKS AND THESES

A New Method for Determining Refraction by the Reversed Image, by Dr. Eug. Ry[illegible]ner (*Thesis for the Doctor's Degree* in Zurich).

The author has contrived and tested a fourth method for the objective examination of R, which may be added to the three ordinary methods: the upright image, skiascopy, and the direct measurement of the distance of the reversed image, of which it is, after all, only a variation.

It depends upon the following fact: If in the examination by the reversed image we place a test object—for example, the point of a needle—in the plane of the true image of the fundus of the eye, and then move the head, the apparent motions of the needle and the image will be the same; that is, of the same rapidity, if the two are at the same point. If the needle is nearer the observer than the ophthalmoscopic image, its apparent motion will be greater; if it is farther away, the motion will be less. By approaching or withdrawing the needle, we can determine exactly the situation of the true image. The focal distance of the lens being known, the distance of this lens from the principal plane of the eye determined, and, finally, the distance of the reversed image from the eye measured directly, it is easy to calculate the condition of R. Only the central part of a large lens should be used, on account of the spherical aberration. For a lens of + 10 D placed at a distance of 10 centimetres from the principal (it may be, in practice, from the base of the cornea, since this gives rise only to negligeable errors), the difference in refraction between the central parts and periphery is 0.5 D.

To avoid the influence of involuntary movements of the hand, the apparatus is fixed upon an iron standard. The square network of metal wire slides upon a graduated horizontal arm, which also carries the lens, and may be applied to the inferior border of the orbit. By means of a wire, the sliding is easily governed by the left hand, while the other holds the ophthalmoscope. The head of the patient is held in a rest.

The author gives a table comparing the results of sixty-nine determinations made at the clinic of Mr. Eug. Fick (in Zurich) with those of the three other methods. It appears from this table that the method and apparatus of Rychner are very satifactorily accurate, provided there is no considerable astigmatism present. The pupil must always be dilated. The apprenticeship and practice of this method are much longer than those of the usual methods. According to the author, it claims only to complete them, principally for the cases of diffuse opacity of the media, especially the lens, when it gives good results when the other methods are no longer applicable.—G. Haltenhoff.

Filamentous Keratitis, by Dr. G. Sourdille (*Paris Thesis*, Steinheil, 1895).

Filamentous keratitis is a relatively rare and often unrecognised affection. Sourdille has observed five cases in 10,000 patients, and it is from the study of these five cases, very thoroughly observed, and from the memoirs of Hess and Nuel upon the question, that the author draws the following conclusions:

Filamentous keratitis is an affection of the corneal epithelium and, accessorily, of the conjunctiva, characterised by long, slender excrescences, analogous to a filament of twisted silk.

These filaments, essentially formed of more or less modified epithelium, present themselves in various microscopic forms, which can be reduced to the following types:

A. Fibrillar filaments.

B. Cellular filaments, of polyhedral or elongated cells.

The causes of this affection are many—irritating chemical agents (atropine), microbic infections, irritation of the cornea (herpes), and traumatisms.

From the pathological standpoint, it is an epithelial keratitis; there is an abnormal proliferation of corneal epithelium, the cells of which undergo sometimes a fibrillar degeneration and roll themselves up in the form of a thread ; sometimes a mucous degeneration.

The conjunctival mucus, moreover, takes an accessory part in the formation of these filaments.

From the clinical standpoint, the affection is characterised by the slowness of its development and the constant tendency to return. The prognosis is, nevertheless, benign, but its slowness, its chronicity, and the pains which it excites, distress the patient and necessitate energetic treatment.

Treatment must meet the following indications : Avoidance of collyria of atropine and cocaine, which ought in urgent cases to be replaced by collyria of hyoscyamine. Abrasion of the pedicle of the filament. Instillation of methyl violet 1 to 1000. Use of a compression bandage, and internally centipyrine or quinine as accessories.

The numerous illustrations intercollated in the text and the very thorough histological study of the cases which the author has observed, render this work very interesting for reference.

MEDICAL JOURNALS

On the Etiology and Treatment of Some Cases of Pseudo-Membranous Conjunctivitis; Clinical and Bacteriological Contribution, by Dr. O. Pes (*Journal de l'Academie de Medecin de Turin*), V. L., and LVIII., fasc. 7–8.

After a survey of the bibliography of diphtheric conjunctivitis, and the various publications on its treatment by antitoxin, the author reports four new observations collected in the clinic of P. Reymond.

Observation I.—A girl of four years, admitted Feb. 3, presents a swelling of the lids of the right eye. The skin is violaceous, and there is a reddish, serous discharge. The left eye is the seat of a purulent secretion. On the tarsal conjunctiva of the right eye there is a false membrane, rather thick, adherent, and leaving, after obl tion, a bleeding surface. The cornea is normal. The pre-auricular gland is not swollen. Lotions of sublimate 1 to 5000 and instillations of silver nitrate 2% are ordered. Feb. 4, no change in the condition of the eye. Five c. c. of Behring's serum (600 units) are then injected. Feb. 5, the improvement is very marked; the false membrane is thinner and easily removed. The purulent secretion is increased. Feb. 6, there is still some secretion, but the false membrane has disappeared. The lotions and the instillation of silver are continued, and the child is discharged well on Feb. 10.

Microscopic examination of the pseudo-membrane shows some cocci and some indefinite bacilli. The culture in twenty-four hours gives colonies of diphtheria bacilli, which, injected subcutaneously, kill a guinea-pig in thirty hours with typical lesions.

The author remarks that the microscopic examination was not satisfactory, and that the injection was given only when the culture demonstrated the presence of the diphtheria bacilli. The injection of 5 c.c. was sufficient; it determined a rise of temperature of one degree, which recurred for three days.

Obs. II.—A girl of twenty-two months, admitted May 11, with an affection of the left eye of seven days' duration. On that side there is swelling of the eyelids, which are also dark red and rigid. Eversion of the lid is painful and difficult. There is no adenopathy. The conjunctiva is covered with a thin pseudo-membrane, adherent only at certain points. There is a profuse purulent discharge, and the bulbar conjunctiva is chemotic. The cornea is sound. The same day 5 c.c. of Behring's serum is injected, and the same local treatment adopted as in the preceding case. May 15, there is no pseudo-membrane.

The microscopic examination of the pseudo-membrane showed no bacteria which admitted a probable diagnosis. Cultures were sterile, only a single colony of staphylococcus aureus developed.

Orlando Pes thinks that in this case the conjunctivitis was caused by the staphylococcus, and that the antitoxin did not act in an altogether specific way. But I may remark that this conclusion does not rest on a very firm basis; in the first place, because it was not thoroughly demonstrated that the case was not diphtheria (the author speaks of only one trial-culture), and, secondly, because the simultaneous employment of local treatment with nitrate of silver renders it impossible to attribute the cure obtained to the serum alone.

Obs. III.—A girl of two years, received at the clinic June 2.

The child was defervescing from measles, the eyelids are covered with eczematous lesions, associated with a blepharitis. The tarsal conjunctiva is covered with a thick pseudo-membrane, adherent only at certain points. The bulbar conjunctiva is œdematous, and presents a purulent secretion. The cornea is the seat of two grayish abscesses. An injection of 5 c. c. of Behring's serum is given, and the same local treatment introduced as in the preceding cases; irrigation with a sublimate solution 1 to 5000, and instillation of 2% silver nitrate.

Two days later, the pseudo-membrane has disappeared; the secretion is distinctly purulent. The corneal abscess ruptures spontaneously, giving rise to a hernia of the iris, but panophthalmia does no develop, and cicatrisation follows rapidly. June 22, the child leaves the clinic well. The microscopic examination of the false membrane shows various cocci and a few bacilli. The culture allows the isolation of the diphtheria bacilli, and the staphylococcus albus, or aureus. The diphtheria bacilli, isolated and injected subcutaneously, kill a guinea-pig in twenty-six hours. In this case the inoculation with serum was made before the bacteriological diagnosis, the microscopic examination not having given a definite result.

Obs. IV.—A girl of eleven months, admitted to the clinic June 28, with an affection of both eyes, dating back five days. The eyelids are swollen, the skin is red. The tarsal conjunctiva is covered with a thin, non-adherent, pseudo-membrane. The bulbar conjunctiva is œdematous, and presents a muco-purulent secretion. The left cornea shows a central infiltration. 5 c. c. of serum (1000 units) is injected, and the local treatment of the previous cases begun.

June 30. The improvement is very marked. July 3. The right eye is well; the left still presents a central ulceration in the process of healing.

The microscopic examination shows some short bacilli, and in the left eye some masses of cocci.

Cultures show the presence of the diphtheria bacilli; the subcutaneous injection of 1½ c.c. of a bouillon culture kills a guinea-pig in seventeen hours, although morphologically the bacilli belong to the short variety.

In none of these cases has Orlando Pes been able to obtain information as to the service of the diphtheritic infection.

He concludes that the antitoxin has a prompt, efficacious action, and that it makes the false membrane disappear very rapidly. It was efficacious even in the second case, where the diphtheria bacilli could not be isolated.

The microscopic examination of the false membrane was intended to eliminate any other form of conjunctivitis when the pathogenic agent is easily seen (gonococci, bacilli of Weeks, pneumococci).

But the scarcity of the diphtheria bacilli in the false membrane made the microscopic examination alone insufficient for the diagnosis of its presence.

The quantity of serum injected never exceeded 5 c.c. in a single dose; that is sufficient when there is no diphtheritic complication of other mucous membranes.

I will add only a word in review of this conscientious and interesting work. Orlando Pes, after having said that the microscopic examination is always useful, declares that in his observations it has shown itself insufficient. It is certain that in the cases of ocular diphtheria the number of bacilli which one meets in a preparation is very small, especially if we compare them with the abundance of gonococci, bacilli of Weeks, or pneumococci, which one finds in the conjunctivitis produced by these organisms; but with a little practise one easily becomes able to recognise them and to make a probable diagnosis. Preparations by Gram's method are particularly useful in demonstrating the diphtheria bacilli.

It goes without saying that for a positive diagnosis, culture and inoculation are always necessary. But, as the author elsewhere remarks, the microscopic examination permits the exclusion of other forms of conjunctivitis and also allows one to judge better of the associated bacteria which play a part in the ocular affection.—V. M.

Iodine in Trachoma (Preliminary Paper), by Dr. NIEZNAMOFF (*Vratch*, No. 47, 1895).

With the object of using iodine in a pure state in trachoma, the author has prepared a solution of this substance in liquid vaseline. This liquid dissolves about 1⅓% of pure iodine. The solution of iodine in liquid vaseline with the addition of sulphuric ether, or what is better, ether petrolé, gives solution of iodine of 3, 5, or even 10%.

In the cicatricial form of trachoma, complicated with pannus, the author applies with excellent results at ½% solution of iodine, in the dry form, follicular or papillary, a 2, 3, or 5% solution.

In early trachoma, with an abundant secretion, it is well before proceeding to the use of strong iodine solutions to make some applications of 5% iodine in glycerine, which has the effect of drying the palpebral conjunctiva.

In dacryocystitis he instills a solution of $\frac{1}{2}$ to 1% ; in blepharitis, the author advises the regular application of the latter solution with friction upon the palpebral margin.

Finally, old infiltrations resulting from parenchymatous keratitis resolve under applications of liquid vaseline with 2, 3 or 5% of iodine to the palpebral conjunctiva.

The iodine and ether being volatile, the author preserves this solution in flasks of dark glass, hermetically sealed, and he uses the same solution for only seven days.—MUTERMILCH.

New Treatment of Malign Myopia in Evulsion of the External Nasal Nerve,
by Dr. ROLLAND (*Le Bulletin d'Oculistique*, Nov. 1895).

The author has applied to malign and progressive myopia the therapeutic procedure contrived by Badal for the relief of the tension of glaucoma the evulsion of the external nasal nerve. This operation has been practised by Rolland on 502 of his patients. Evulsion of the external nasal nerve, according to the author, arrests the myopia in the condition which it shows at the time of operation. In some cases the result is immediate. Rolland cites a case where vision of $\frac{1}{10}$ was improved to $\frac{2}{3}$ after operation.—V.

V.—MISCELLANY

ITEMS.

Dr. Koster has been appointed professor of ophthalmology in the Faculty of Medicine of Leyden.

Dr. George Berry has been appointed lecturer on ophthalmology in the University of Edinburgh, vice Argyll Robertson, resigned.

NECROLOGY

Dr. Sch rmer, professor of ophthalmology in the Faculty of Medicine of Griefswald.

Dr. James P. Parker, editor of the "Annals of Ophthalmology and Otology," died at his home in St. Louis, Mo., February 1st. Dr. Parker was 42 years of age, and graduated in medicine in 1886. He commenced the publication of the "Annals of Ophthalmology in 1892, and by his untiring energy had, at the time of his death, established the journal on a sure foundation. It will be continued under the direction of Drs. Casey H. Wood and T. M. Hardie.

CORRECTION.—In the January number, 1896, page 16. The striated portion of the drawing represents the visual field.

ANNALES D'OCULISTIQUE

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I.—ORIGINAL ARTICLES

MEMOIRS

EXTRACTION OF METALLIC FOREIGN BODIES FROM THE POSTERIOR SEGMENT OF THE EYE BY MEANS OF THE ELECTROMAGNET.

By Dr. **ROHMER.**

The history of surgical interference in injuries of the eye with penetration of foreign bodies has been so frequently related that I have no intention of dwelling at length on this point. It will be sufficient to state that Fabrice de Hilden (1666) and Morgagni were the first to employ a magnet to remove foreign bodies from *the cornea.* It was not until 1745 that an English oculist employed a magnet to extract a foreign body from the iris. Von Graefe, Ed. Jaeger, Critchett and Desmarres were the first to use forceps in extracting foreign bodies lodged in the vitreous. In 1858 Dixon published a case in which he succeeded in extracting a fragment of a pair of scissors from the vitreous with the aid of a magnet and forceps. After 1870 many articles appeared and the names of Hansen, Terson, Busse, Tomsend, Saloman, Wagner, Bastide, Knapp, Jeafferson, Leber and Sichel may be mentioned, some of whom studied the position of the foreign body in the eye, and others the indications for interference, but without the aid of a magnet.

In 1875, MacKeon, of Belfast, again attempted Dixon's experiment, and he was in reality the first to employ magnetic attraction for finding metallic foreign bodies in the interior of the eye. Snell and MacHardy followed in the same course. In Germany, Hirschberg employed an electromagnet instead of magnetized steel, and his instrument is still used in nearly all clinics.

In France but few articles on this subject have appeared, with the exception of Balliar's *Thesis*, in 1865, Giraud-Teulon's article in the *Dictionnaire* of Dechambre, and the *Traite* of Yvert, in 1880, all works of compilation. In 1881 an admirable report was made to the Société de Chirurgie, by Dr. Berger, who, in reference to a communication by Dr. Galezowski, described the thirty-one cases which were known at that time of foreign bodies in the posterior segment of the eye and in which forceps, curetts, blunt hooks, magnets or electromagnets had been used for extraction. Afterwards came the observations of Meyer (1882), of Dufour (1885), and Pooley's efforts (1880), to make a diagnosis with a magnetized needle. Finally, of late years, the masterly works of Hirschberg should be mentioned on extraction of metallic foreign bodies from the eye with the aid of an electromagnet, and the report of Coppez to the French Ophthalmological Society, in which he reviewed the question of foreign bodies as it was known at that time (1890).

Before entering upon a discussion of this question, I desire to report a case which I have had occasion to observe:

Case.—M. Auguste, a coppersmith, thirty years of age, was hammering a sheet of copper. As the result of a false movement, his hammer struck against another hammer held by an assistant. A splinter was broken off by the blow and struck the workman in the lower internal portion of the right eye. The accident occurred at half-past seven in the morning, and the man came to the hospital for consultation at ten o'clock.

I was absent on that day, and the patient was seen by Dr. Faure, the Chief of the Clinic.

August 24.—At that time there was in the right eye a quite severe sub-conjunctival hemorrhage, occupying the internal portion and extending above and below to the median line.

At a few milimetres within and below the limbus there was a small white depressed zone, indicating the point of penetration of the foreign body. The patient's sight was perfect, but he complained of seeing the foreign body whenever he moved his eye.

The pupil was dilated with atropine, and with the opthalmoscope the exact condition of the eye was readily ascertained.

There was nothing abnormal in the cornea, and the iris was regular and completely dilated. Direct illumination with a plane mirror revealed the foreign body, oscillating in the eye with the slightest movement, but always following the same oblique direction from below upwards and within outwards. When the eye was at rest, the body fell by its own weight to the lower part, and was no longer perceived by the patient.

With the opthalmoscope the foreign body presented the form of a large curved rod, with smooth, highly refractive borders. Furthermore, it was accompanied by two bubbles, also refractive, the larger of which was attached to the upper portion, and the smaller situated somewhat below.

These bubbles were only air, which had been introduced with the fragment of steel, and the fragment was surrounded with a thin zone of air, which gave the refractive appearance to its borders.

Nothing abnormal in the retina.

After an antiseptic bath, the eye was covered with an occlusive bandage.

August 27.—The patient came again to the clinic. The sub-conjunctival echymosis had increased in size. The iris was duller than in the other eye. The visual acuity remained good, and there was no trace of inflammation.

On ophthalmoscopic examination, the foreign body was readily seen, but it no longer had the same form. It resembled a spindle, and its borders were irregular. It might have been compared to a quarter of a melon, seen on its edge. There was a metallic reflex, and the bubbles of air which had accompanied it had entirely disappeared.

I then saw the patient for the first time.

As there was no inflammatory reaction, complete rest of the eye was prescribed. The fragment of steel still presented the same form, but its movements became more extensive, especially in the lower segment of the eye, on account of the softening of the vitreous provoked by its presence.

September 11, the day after I had first seen the patient, I decided to extract the foreign body with an electromagnet.

After the ordinary antiseptic precautions, I dissected a flap of conjunctiva from the lower internal portion of the eye-ball, and made an incision three to four millimetres in length in the sclera between the inferior and internal rectus muscles at a distance of seven to eight millimetres from the sclero-corneal limbus, and almost at the point of penetration of the fragment of steel. I then introduced the curved branch of Chardin's electromagnet, and almost immediately the patient felt that I had drawn out the foreign body, although I did not feel the shock of the metallic fragment against the point of the instrument. The instrument was withdrawn with nothing on it, but the patient no longer perceived the foreign body. A second attempt was also fruitless. Finally, on a third trial, I saw the fragment of steel projecting between the lips of the wound, by which it had been arrested. It was immediately removed, and the conjunctival wound closed with two sutures. During the entire operation, which was of very short duration, only a very small drop of vitreous escaped. The patient was then examined with the ophthalmoscope, and the eye appeared perfectly normal. The fundus was very clear, and there was not a drop of blood in the vitreous. V = ½.

September 13.—The sutures were removed. The same condition of the eye was found. No cloudiness of the vitreous. The tension was slightly diminished. T = 1. Occlusive bandage.

September 17.—The appearance of the eye was normal. The tension has become the same in both eyes. The ophthalmoscopic appearance of the media and of the fundus of the eye was perfectly normal. V = ⅓. Occlusive bandage.

In a few days the patient left the hospital entirely recovered, and with a visual acuity of ⅔.

Two months later he complained of a diminution of vision, and on ophthalmoscopic examination there was found a very small detachment at the point of entrance of the foreign body and of the magnet. I immediately prescribed rest in bed in the horizontal position, with a compress bandage, for three weeks. At the end of that period the fundus of the eye had regained its normal appearance, and the visual field, which had presented a small scotoma above and within, had again become normal. V = 1. From December, 1894, to the present time (July, 1895), recovery has continued absolutely perfect.

The foreign body extracted from this patient's eye was a small flattened chip of iron, about the shape of an elongated oval, and measured exactly two millimetres in length, by one millimetre in breadth. Its weight, measured by my colleague, Dr. Guérin, was exactly one milligramme.

The various features of this case give rise to important considerations, but I only wish to consider the most interesting, especially from the practical standpoint of curative operative interference.

First of all is the question of the benignity of interference. All authors agree that if the instrument is well disinfected it may be introduced into the vitreous with impunity, and without risk of producing suppuration in this medium. Hirschberg, Cohn and Goldschmidt [1] plunge their instrument in a boiling solution of soda. I act in this case as in all other operations on the eye, and plunge the point of my electromagnet in boiling water, which is always at my side during the operation, and serves to render aseptic the instruments which I have made antiseptic in a carbolic bath.

Can an instrument be introduced into the vitreous with impunity without harming the structure and consistency of this medium? This is one of the gravest, if not the most serious objection, that the adversaries of the electromagnet have brought forward in opposition to this method. In recent cases, and especially in simple cases, like mine, the foreign body traces a path in the vitreous, and if it is movable, moves in the direction given by the force of penetration. But this limitation does not last. After a certain time, varying according to the disorders produced, the size, the weight, etc., the vitreous softens and the metallic body is able to move in all directions. The ideal operation would evidently be to introduce the point of the electromagnet in the path traced by the foreign body, to seize it and draw it out. The injuries of the operation would be inconsiderable or even *nil*, and there would be less resistance to the attracting current on the part of the vitreous, as will be seen further on. But in reality this does not and can not take place. After determining approximately the location of the foreign body, the point of the instrument is introduced somewhat blindly in the direction which is supposed to be the right one. Several slight movements of circumduction are made, so as to be sure of encountering the foreign body, or including it in the zone of magnetic attraction. It does not seem that when these manœuvres are reasonably performed, there results any great harm to the eye. It is evident that one should endeavor to avoid introducing the electric magnet eight consecutive times in the eye, as Hirschberg was obliged to do; the foreign body in my case was extracted on three introductions. But in such a case circumstances and chance enter largely into the success after the skill of the operator and the clinician have succeeded in localizing the intruding body.

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[1] Ueber Entfernung von Eisensplittern, etc., by Dr. H. Goldschmidt. (*Deutsche med. Wochenschreft*, 1895, Nos. 3 and 4.)

The course of the foreign body in the vitreous depends upon its form, its nature, and its speed. When the wounding agent is endowed with a certain amount of speed it will strike the posterior wall. Several conditions may then result. Either the force of propulsion is completely destroyed by the resistance of the wall, and the foreign body is arrested and reflected backward (Berlin). This retrograde movement has been doubted by von Graefe. Or the force of propulsion overcomes the resistance of the wall, the foreign body tears it and comes out of the eye. When, on the contrary, the foreign body is endowed with inconsiderable speed, the resistance of the vitreous is sufficient to arrest it, and if it is of metallic nature, if it is dense, it obeys the laws of gravity and falls to the lower part of the eyeball. If, on the other hand, its density is less than, or equal to that of the vitreous, it floats in the midst of the vitreous. The form is also of some importance. Thus, a fragment of a cartridge capsule, having a large surface in relation to its weight, may also float, if this surface is horizontal in the vitreous. Finally, the foreign body is not always entirely lodged in the vitreous, for if it is very long and the force of penetration is slight, one of its extremities may remain outside (Jeulin).[1]

In one of Leber's cases[2] the foreign body penetrated the fundus of the eye and was implanted in the sclera at such a point that on the opposite side a small black point was found on the external surface of the eyeball indicating the point of implantation. While an attempt was being made to cut around this little projection with great precaution, the foreign body suddenly disappeared but a magnet introduced through the opening succeeded in drawing it out and it was readily extracted.

As for the volume of these foreign bodies, Schloesser[3] found in his experiments on the eyes of pigs and cattle that fragments of iron exceeding 80 milligrammes readily caused detachment of the retina by the traction exerted by the magnet on the foreign body implanted in the retina. He also recommends that as soon as a large foreign body has reached the anterior chamber, the current should be interrupted so as to avoid contusion of the corneal field by the foreign body.

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[1] Jeulin. Etude sur les corps etrangers intra-oculaires, etc. (*Paris Thesis*, 1894.)

[2] Transactions of the 23d Congress of Ophthalmology, Heidelberg, 1893, p. 159.

[3] Transactions of the 23d Congree of Ophthalmology Heidelberg, 1893, p. 242.

Finally, foreign bodies weighing less than 10 milligrammes can not be withdrawn from the fundus of the eye because with a reduction in volume the surface is too great and the resistance too great. He thinks that it is improbable that metallic bodies less than 10 milligrammes in weight can penetrate to the fundus of the eye.

My observation would seem to prove the contrary since here the foreign body only weighed 1 milligramme and was readily extracted with Chardin's electro magnet.

But before the operation it is well to be sure that there is a metallic foreign body in the eye. Clinicians well know how frequent it is for a patient to claim that there is no foreign body in the eye when one has penetrated this organ, and on the other hand, it is often difficult for the physician either to discover the point of entrance or to determine on simple examination whether the foreign body perceived in the eye is or is not metallic, and capable or incapable of being attracted by a magnet.

It is useless to discuss the importance of this question of diagnosis.

The diagnosis of the presence of a foreign body in the interior of the eye is often difficult, especially if there is at the same time a traumatic cataract. Berlin [1] in these cases considers the presence of a contraction of the visual field above as of great importance. From an anatomical standpoint this contraction is due to a circumscribed hemorrhage in the vitreous arising from a wound in the choroid which is almost always made by the foreign body on the posterior wall of the eyeball. The foreign body following the laws of gravity falls to the bottom of the eye and thus traces a path for the blood coming from the choroid, which prevents the luminous rays from reaching the portion of the retina which it covers. The metallic fragment is almost always situated in the lowest portion of the eye at about equal distances from the corneal border and the equator of the eye. According to Berlin this would be the place of election for extracting the foreign body, but even when the operation succeeds, iridocyclitis is observed as a consequence.

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[1] *Ibid.*, p. 158; discussion.

Stolting, in reference to Schloesser's article,[1] gives a metho of diagnosis which was very successful in locating cysticerci i the eye, but which failed twice when it was employed for intra ocular foreign bodies. The method is, after approximatel locating the foreign body with the ophthalmoscope, to introduc a very fine needle in its neighborhood and observe it with the ophthalmoscope. If it does not correspond exactly to the foreig body or the cysticercus, a second or even third prick is made, which will in all probability reach the proper spot, and will serv to make the incision and the extraction more easy.

Still more recently Gallemaerts[2] (of Brussels) introduced Gerard's magnetometer by means of which the search for foreign bodies in the eyeball is reduced to a simple physical experiment. The minimum weight of iron which can be determined is 1 demi-milligramme. From the author's investigation certain facts ma be ascertained, not only as to the presence of a metallic foreign body, iron or steel, but even of its size and position. The weigh of foreign bodies, the presence of which have been determined b Gerard's magnetometer, has varied between 8 milligrammes an 315 milligrammes. Statistics show that in two-thirds of th cases the foreign body is of iron, and that its weight is rarely les than 2 milligrammes.

In order to derive advantage from the magnetic method, it i not sufficient to use a simple magnet needle, such as Pooley used One should not be content with suspending a magnetized needl on a thread and placing it in a glass tube held in the hand, or i a glass box attached to a standard. Under such conditions som information could certainly be obtained if the foreign body wer very large, but if it only weighs a few milligrammes, as is mos frequently the case, the deviation of the magnetized needle doe not occur, or rather is inappreciable to the eye. The apparatu should, on the contrary, fulfil certain conditions of stability an precision, which will be found in Gerard's magnetometer.

There is another method of diagnosis given by MacHardy an described by Dr. Coppez[3] in his report to the French Ophthalmo logical Society. MacHardy, in diagnosing the existence and the nature of a foreign body in the eye, advises bringing an electromagnet, charged by a powerful machine, near the eye. The severe pain and the dragging caused by the displacement of the foreign body indicates its metallic nature. In his experiments, Dr. Coppez has employed an electromagnet, with a portative force of 12 kilogrammes. The current may be opened or closed at will, by an interrupter placed in the course of the wires. For the experiment the patient is instructed to place the injured eye as near as possible to the electromagnet, and it is observed that whenever the current passes, he complains of severe pain in the form of traction in the eye, if it contain a metallic foreign body. The sensation experienced is still greater when the interruptions are rapidly made. It may happen that if the foreign body has been long encysted, the patient may feel no pain. But in this case the foreign body is rendered more sensible to magnetic attraction, and if Thomson's compass or Gerard's apparatus are employed, the deviation of the needle, scarcely perceptible before the experiment, become much greater after it.

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[1] Transactions of the 23d Congress of Ophthalmology, Heidelberg, 1893 p. 161.

[2] Société de Francaise d'ophthalmologie, May, 1894.—See p. 143 for a description of th apparatus.

[3] Intervention chirurgicale dans les blessures de l'oeil. (Bull. et memoires de la So franc. d'ophth., Paris, 1890).

It should be stated that in all these experiments the patient should not have about him any metallic object which might influence the magnetic needle, such as buttons, keys, etc., or even a hernia truss. The question of diagnosis of a foreign body being thus decided, one should then consider the question of its location in the different regions of the eye and the treatment required.

A foreign body which strikes the eye may have expended its force of propulsion as soon as it meets the cornea, and lodge in the anterior chamber and the iris. Or it may reach the lens and become fixed in it, or traverse it, and enter into the vitreous and float there for some time. Or again, it may strike against the posterior pole of the eye and return into the vitreous by another path. Finally, it may completely traverse the eye and remain imbedded in the posterior wall of the sclera, or may pass into the orbit. Foreign bodies may also penetrate the eye in a more peripheral part of the cornea, traverse the iris, and become fixed in the ciliary region. It may also reach the interior of the eyeball by perforating the sclera, or the sclero-corneal region, lacerating to a greater or less extent the parts through which it passes, and thus cause lesions, which are of some importance. These lesions may be the source of most serious accident to the affected eye and its mate (Coppez).

I will not consider each of these locations, and will only dwell for an instant on the position in my case in the vitreous.

In more than a third of the cases of penetration of foreign bodies into the interior of the ocular cavity, these will be located according to statistics in the vitreous and the surrounding part: ciliary region, choroid, retina and optic nerve. According to Coppez, in seventy out of ninety-six cases, the foreign body, after penetrating by the cornea or the sclera, invaded the posterior hemisphere of the eye and became fixed:

Twenty-two times in the vitreous.

Thirty-eight times in the ciliary region.

Twice between the retina and the choroid.

Twice in the optic nerve and its sheath.

Eight times in an exudate which took the place of the vitreous in atrophied eyes.

As for the nature of these foreign bodies, they were composed according to the observations made by Coppez, of:

Iron or steel, forty-two times.

Lead shot, ten times.

Fragment of a cartridge or piece of copper, ten times.

Fragments of stone, six times.

Zinc, once.

Wood, once.

When a foreign body reaches the deeper part of the eye, it will cause disorders varying in intensity and gravity according to its size, the region of the entrance, its degree of cleanliness, its chemical composition, the place which it occupies, and its action on the neighboring part. After its penetration, the eye may be immediately and irrevocably lost from the extent of the lesion, escape of vitreous, hemorrhage or infection. Or the foreign body entered by a very small opening and only caused an insignificant lesion, with partial or complete preservation of vision.

The diagnosis of the presence of a foreign body in the eye is more easily made immediately after the accident. Later, disturbances of the media occasioned by hemorrhage, suppuration, cataract, etc., are serious obstacles to the establishment of a positive diagnosis. At other times a hemorrhage from the uveal tract surrounds the metallic particle and conceals it, and even if these hemorrhages do not occur it may also happen that a fragment of iron may lodge behind the iris, in the ciliary region, or even between the retina and the choroid without the slightest trace of it being found either on oblique illumination or with the opthalmoscope.

It will then be advantageous to employ the various magnetic methods of diagnosis, or magnetometers. A perfectly aseptic probe might be introduced through the wound and encounter the metallic foreign body thus revealing its presence, but there would be risk of increasing the injury and the lesions, which one is endeavoring to allay.

A patient who has a foreign body in the vitreous may sometimes not perceive it or scarcely notice it, but most frequently it causes very severe pain and there is immediate diminution and even complete disappearance of vision. Examination of the visual field will show a scotoma or a variable contraction due to the injury or detachment of the retina. Prolonged or repeated ciliary irritation, but slightly related to the primary lesion, will also be suspicious of the presence of a foreign body. Under these conditions sympathetic ophthalmia may appear in the other eye and necessitate immediate enucleation of the injured eye. Again if the foreign body is aseptic, it may become encysted ; this is especially frequent with shot. If germs are introduced (which frequently happens from the dressings) suppuration will occur. Sometimes there will be a more or less thick and dense white cord uniting the foreign body to the wound by which it enters, a cord formed by proliferation of the cells of the vitreous irritated by the passage of the foreign body.

The position of the foreign body is also of great importance. Thus the ciliary body generally supports them very badly, while other membranes are more tolerant.

The prognosis is in general very grave. Of sixty-three cases of foreign bodies in the posterior segment of the eye observed by Coppez, it was necessary to enucleate the eye ball in forty. Before giving the prognosis, one should as de Wecker properly recommends, consider the chemical composition of the foreign body and endeavor to discover whether it was free of all germs, and whether the wound was infected by the first cares which are frequent more harmful to the patient than the injury itself (Coppez). T appearance of foreign bodies in the fundus of the eye varies accor ing to their nature. Fragments of iron, more or less oxidize are generally black. Pieces of copper also appear black most fr quently, but they have a metallic reflex. Fragments of ston are more refractive. Lead shot have a rounded form and a black. When the patient is examined after a certain length time, the foreign body may have become encysted, and its tru appearance concealed; it is then gray and more or less rounde (Jeulin)[1].

I now come to a question no less important than that of diagn sis, namely the operation itself, that is to say, extraction of foreig bodies with the electromagnet.

Writers are divided into two classes as to the form of instruments to be used. Some, among whom is Hirschberg, are i favor of weak electromagnets, introducing the point into th interior of the eyeball. Others, among whom are Schloesser Haab, Schmidt-Rimpler, etc., only employ powerful electromagnets, the blunt extremity of which is only brought in contact with the external wall of the eye. They claim that in this way the disorder brought about by the introduction of instrument is avoided. But as we will see, the injury which may arise from a very severe current, is at least equal, if not greater than that due to the introduction of an instrument in an eye and the apparent advantages to this method are far from being compensated by its somewhat illusory advantages.

It seems to be a matter of indifference whether the magnet is excited by a continuous or an interrupted current, such as is given for electric illumination. The tension of the current is the important factor. Thus, for electric illumination, at least 65 volts are necessary, while 110 volts are commonly employed.

The most favorable form of the magnet for use with intraocular foreign bodies has been much discussed by authors. Schloesser[2] who is in favor of a powerful electromagnet considers the question of what apparatus is the least cumbersome and also what is the weakest electromagnetic force which will surely extract all fragments of iron from the eye. As for the magnet, it seems that a large block of iron terminated by a cylindrical prolongation about 13 centimetres long, by 4 centimetres in diameter and surrounded by 500 turns of copper wire is the most suitable instrument. One pole attached to this extremity acts on a magnet in the most efficient manner to concentrate the magnetic force.

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[1] Jeulin. Etude sur les corps etrangers intra-oculaires, etc., *Paris Thesis* 1894.

[2] Schloesser, Bedingungen zur Entfernung von Eisensplittern durch den Magneten. 23d Ophthalmological Congress, Heidelberg, 1893.

A cone with blunt point is the best instrument for surely and easily attracting a metallic particle. Schloesser also states that a metallic fragment of elongated form always has a tendency to turn in the magnetic field so that its axis is situated in the direction of the current, a fact which is essentially favorable to the extraction of the fragment from the eye.

As for the electrical force which is capable in his apparatus of developing an amount of magnetism available for all cases, Schloesser thinks that a tension of 27 to 30 volts is sufficient.

In his experiments Schloesser introduced through an incision in the sclera into the desired portion of the fundus of the eye pieces of Swedish iron, or German or English steel varying from 10 to 500 milligrammes in weight and then applied his magnet. All fragments whose weight was within these limits were always attracted whether they were in the anterior chamber or in some part of the fundus of the eye, even through the uninjured lens.

The practical question is how a fragment of iron may be most readily extracted from the eye. First of all it is clear that the extraction will be more easy the sooner the operation is undertaken after the accident. It is then desirable that every ophthalmologist possess an instrument with which extraction can be performed. For this object Schloesser has had an electromagnet constructed which can be adapted to any illuminating apparatus in the place of the electric lamp. Thus the surgeon with his apparatus can transport his patient to a hotel or any place where there is electric illumination and there proceed to extract the metallic body.

In the second place we must consider by what path the metallic body may be most readily withdrawn, whether through the lens and the pupil or through the incision in the sclera.

It is certain that if, even in the majority of cases, the lens is already injured by the penetration of the foreign body, thus making an open road for the escape of the metallic fragment, it will always be very difficult to utilize this path; the cases in which has been possible to extract metallic fragments through a corne wound are rare. It is then preferable, and this is also Gruening opinion, to make a scleral incision to serve as exit for the foreig body. Schloesser thinks that an incision in a point of the cilia muscle is most favorable for easy extraction of a metallic body an is least injurious to the eye.

Schloesser also recommends only applying the magnet to th eye at the point where the blunt end of the instrument shoul attract the fragment so that by this contact the direction of th magnetic axis is prolonged towards the seat of the foreign body For this purpose it is best to apply a brass speculum, to have th eye well under cocaine and if the patient is restless, to fix the ey in the desired position by means of forceps of brass or nicke It is only when all these details have been carefully attended t that the current should be turned on and in a few seconds th metallic particle will be seen to present itself at the desired point.

His new electromagnet consists of a cylindrical bar of so iron, 66 centimetres in length and 10 centimetres thick te minated at both extremities by a gilded conical knob which ma be removed and sterilized. This iron nucleus is surrounded b two coils, 23 centimetres in diameter, through which a curren of 50 to 60 volts tension and 6 to 7 amperes' intensity is passe This current is supplied by a dynamo. Its intensity and henc the magnetic force of the instrument may be regulated by rheostat. The magnet, movable about a vertical axis, rests o a wooden support 105 centimetres high. It weighs with th latter 138 kilogrammes, and its cost is about $110. The mag netic force of the large electromagnet is very considerable. O bringing the conical knobs as near as possible to the point entrance of the foreign body or by slightly inserting it in th wound, foreign bodies no heavier than 0.02 grammes may b extracted from the vitreous and the retina or at least attracte behind the iris. Once there they may be completely removed b introducing Hirschberg's small electromagnet through a sma corneal incision. Thus the necessity is frequently avoided groping blindly in the vitreous with the magnet, an operatio which was always so prejudical to the ultimate condition of th eye. Haab has also demonstrated experimentally that fragmen of iron attracted by the magnet never traverses the lens in a straight line but they travel around it. At the most they pass through the border of the lens quite near the equator. This explains why one can never foresee at what part of the iris or of the anterior chamber the foreign body will appear.

The great difference, as I have already said, between the use of the large magnet and the ordinary electromagnet is that the first is simply placed in contact with the eye while with the small magnet, the magnetic stylus is introduced into the interior of the eye and one is obliged to grope about with it and frequently harm is done simply by this operation.

Another advantage of the large electromagnet is that the diagnosis of the position and size of the foreign body need not be made in advance; it is sufficient to know or even to suspect that there is a metallic foreign body in the eye to justify the use of this instrument. If there is no foreign body the action of the magnet will be *nil*, but if, on the contrary, there is metal present, it will be attracted and even blindly extracted by the great attractive force of the magnet.

But the benignity and the advantage of the large magnet are only apparent, if Hirschberg, who has had great experience with this method, is correct, and it is precisely this great force which is dangerous because of the disorders which it may occasion.

In fact, according to Hirschberg,[1] the cases in which one may reasonably expect success may be undertaken with a small electromagnet of 200 to 500 grammes portative force, according to the thickness of its extremity, after a diagnosis as approximate as possible has been made and with proper skill. For most physicians this will be the only instrument. The large electromagnet, such as Haab recommends, can only lead to grave operative lesions; ruptures, hemorrhages or failures as will be seen from the cases described by Hirschberg. In such cases the patients must be taken to a physical laboratory and then taken out after suffering the severe pain caused by the powerful magnet, since the patient is obliged to sit in a chair and cannot be chloroformed.

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[1] **Hirschberg.** Ueber die Entfernung von Eisensplintern—aus der Netzhaut von Dr. Hirschberg in Berlin. (*Deutsche med. Wochensch.*, 1894, and *Centr. Bl. f. prakt Augenheilk.*, 1894.)

In most operations Hirschberg relies upon his instrument b cause he understands it, is familiar with its management and force is sufficient. It is capable of withdrawing fragments grea and less than 10 milligrammes either from the vitreous or t retina, whether they are recent or old, hard or soft, or even ve small and fixed solidly between the sclera and the ciliary bod In recent cases it is sufficient to introduce the point of the instr ment (500 grammes portative force) between the lips of tl wound which may be enlarged from 2 to 3 millimetres ; to see tl metallic fragment come from the deeper parts, even through wound in the lens, attach itself to the magnet, without pain, witl out causing further lesions and without taking a false route.

I should also mention here the modification proposed by Sulzei in the form of the magnet ordinarily employed. In the instr ments formerly employed the point introduced into the eye forme one of the poles of the magnet, while the other pole was at tl other side of the operator's hand at the extremity of the instr ment. Under these circumstances the attractive force exerted c fragments of iron is small. A particle of iron in the field of tl magnet becomes itself a magnet with two poles. The pole of tl primary magnet introduced in the eye causes the nearest portic of the fragment of iron to become a pole of contrary name to th of the magnet, and hence attraction, and the farthest portion t become a pole of opposite name, and hence repulsion. The r sultant attraction depends upon the difference between the di tances of the two poles of the magnetized fragment from the po of the magnet. As the fragment is generally very small, th difference is very slight and the attraction weak. To avoid th inconvenience, magnets ordinarily employed are made in the for of a horseshoe. With this arrangement, each pole of the magn can attract the pole of contrary name of the magnetized fra ment. In order to adapt the horseshoe magnet to the extractic of fragments of iron lodged in the eye, Sulzer has devised tl following instrument : The nucleus of soft iron has the form a horseshoe with branches near together. The point which forr the two poles is composed of two parts fastened together ar magnetically separated by copper. At the other end they separa

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1. Sulzer. Remarques sur l'adaptation de l'electro-aimant, et. II. Internatio Congress of Medical Sciences, Rome, 1894. (*Annales d'Oculistique*, May 1894, p. 153.)

in the form of a fork, the two prongs of which are imbedded in the branches of the nucleus.

The following typical case may serve to show the difference between the two methods, at least from Hirschberg's standard:

September 5, 1892, a coppersmith got a small piece of iron in his right eye. On the next day, Hirschberg found a small linear wound in the lower and outer portion of the cornea about 3 millimetres long into which the iris projected. The anterior chamber was diminished and the lens cloudy and swollen. Pupil relatively dilated. The patient could see the light of a small lamp and the visual field was complete. The foreign body could not be seen. September 28th, a fruitless effort was made at the Physical Institute to extract the metallic fragment, the presence of which was suspected, with a large electromagnet. September 9th, iridectomy. Extraction of the swollen lens masses and introductionin to the vitreous of Hirschberg's electromagnet. After a few movements a small flattened piece of metal was withdrawn measuring about 1½ millimeters square. Recovery with variations of tension and inflammatory attacks. Secondary cataract. The patient went away November 29th. The eye was no longer inflamed. Cloudiness in the lower portion of the cornea. Extensive secondary cataract. When the patient looked upward the red fundus of the eye could be seen with the ophthalmoscope. The tension was somewhat less than in the left eye. $V=\frac{1}{12}$ with a D lens. Visual field was complete.

In relation to my own case, I should say that the battery employed for the operation was a Chardin battery of 32 cells arranged in series. The electromagnet was that of Chardin for the extraction of foreign bodies from the eye.

Dr. Faure, my chief of clinic desired to investigate the attractive force of this electromagnet in an approximate manner. For this purpose he employed the torsion balance method, the current in the electromagnet being supplied by two bichromate of potassium cells.

Two series of experiments gave the following results:

With a mass of 10.75 grammes the attractive force was:

At 4 centimetres	2	centigrammes.
At 2 "	8	"
At 1 centimetre	30 to 40	"

With a mass of 55.75 grammes, the attractive force was:

At 5 centimetres	20 centigrammes.
At 3 "	70 "
At 1 centimetre	220 "

The portative force of the electromagnet was 110 grammes.

These results are in accord with the law that the attractive force varies proportionately as the masses, and inversely as the square of the distance.

A foreign body will be attracted from the eye when the attractive force exerted on it by the electromagnet is greater than the resistance opposed by the vitreous.

As we have seen, this attractive force is very slight. Furthermore, the vitreous opposes a resistance, which, compared to the attractive force is the greater, as the surface situated in the direction of displacement is the more considerable.

For foreign bodies of the same weight, the attractive force of the electromagnet being the same, the resistance opposed to displacement is proportional to the amount of surface of the foreign body facing the instrument.

It will thus be understood why in many cases the results obtained from the use of the electromagnet have been unfavorable, and why for very small foreign bodies it is necessary to have recourse to powerful electromagnet, whose force is doubled by the attachments of the two poles, as in the instruments advised by Haab, Sulzer, etc.

It may seem strange to doubt the efficacy of the electromagnet. I can not, however, resist the desire of quoting the following statistics mentioned by Hirschberg in his article[1] from which it will be seen that in Zurich in the four years preceding the use of the electromagnet (1877 to 1880) of cases of metallic fragments in the vitreous, there were 24 failures, that is 100 per cent. During the 4 years in which the electromagnet and antisepsis were employed (1883 to 1886) of 35 cases, there were only 24 failures, that is, about 68 per cent.

In the first ten years of Hirschberg's practice without a magnet he did not have one successful case. In the ten following years, with a magnet, of 13 successful cases, 7 were noted as satisfactory, and 6 as mediocre. These figures certainly justify the use of this method, and we need not discuss this proposition at greater length.

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[1] Hirschberg. (Centrebl. f. prakt. Augenheilk.), September, 1894, p. 281.

Furthermore, it may be stated that in such cases all the successes are due to the electromagnet. The former gross manipulations with curettes, hooks and forceps, never saved a single eye from which a metallic fragment, situated in the vitreous or the retina, had been removed, nor was permanent vision preserved.

Hurzeler[1] has collected statistics of 313 cases of extraction, or attempted extraction, with the electromagnet, of particles of iron from the vitreous, published by different authors. From these statistics it is found that extraction was successful in 203 cases, that is 64.85 per cent. A certain degree of vision was only preserved in sixty-nine cases, that is 22.04 per cent. The exterior form of the eye was preserved in 35 other cases, that is 17.24 per cent. In almost half of the 313 cases, therapeutic efforts were unavailing. The eye either became phthisical, or it was necessary to enucleate it later.

In eighteen cases, collected by Hurzeler from Horner and Haab's clinic, weak vision (maximum $= \frac{1}{7}$) was preserved in nine cases, at least while the patient was under observation. But the time of observation did not exceed a few months in all the cases but one, and hence definite results cannot be stated, still more so, as in some of the nine cases commencing detachment of the retina was found. In two other cases the form of the eye was preserved, while in the seven remaining cases, loss of the eye was inevitable. In five of these cases they did not succeed in extracting the foreign body.

It is thus seen that neither the results of these authors nor those of the surgeons of Zurich have been very brilliant.

Hurzeler, in his article, reaches the following conclusions:

1. With strong electromagnets, not only pieces of iron, movable in the vitreous, but also fragments of this metal lodged in the retina, may be eventually drawn forward into the anterior chamber, or even completely out of the eye, provided they are not fixed in place by newly-formed tissue.

2. The foreign body does not always in returning follow the path of entrance, but it may make its appearance in another part

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[1] Hurzeler. (Rev. gener. d'opht.), July 31, 1894, p. 326.

of the anterior chamber, or of the eye, if the electromagnet is not very carefully manipulated.

3. The fragment of iron should, if possible, be extracted by the path of entrance, by placing the axis of the magnet as nearly as possible in the direction of this path (Haab's instrument).

4. This operation should be performed as soon as possible, a the presence in the vitreous of a metallic substance may lead to an alteration in the macula, if not to suppuration.

Hildebrand[1] has collected 322 cases of operations in which the electromagnet was introduced into the eye by Hirschberg's method. In 80 cases the foreign body was situated in the anterior portion of the eye. Of these 80 cases, 13 were failures (suppuration) and the result was given as 67.

In 248 cases in which the magnet was introduced into the vitreous, the foreign body was not found in 74.

In 174 cases, the foreign body was extracted. In 23, that is 1 per cent., there was phthisis of the eyeball; in 26, that is 15 per cent., it was necessary to enucleate later.

The definite result was unknown in 34 cases.

A favorable result was obtained in 91 cases, that is 52 per cent., and was divided as follows: In 29 cases (16 per cent.), the form of the eye was preserved, and in 62 cases (36 per cent.), the visual function was well preserved.

In this article Hildebrand gives the following results from the personal statistics of Mayweg, of Hagen:

In 66 operations performed from 1879 to 1880, the foreign body was successfully extracted in 53 cases, and good vision was obtained in 16.

In 15 cases the foreign body was lodged in the anterior portion of the eye.

In 51 cases the foreign body was situated in the vitreous, and in 13 it could not be extracted; 38 extractions were divided in the following manner: Two enucleations, 7 phthisis of the eyeball, 6 were lost sight of, the form of the eye was preserved in 7, vision was permanently preserved in 16.

The failures, says Hirschberg,[2] which occur in spite of the proper application of the electromagnet, depend especially on the severity of the lesions. It is only when the operation is attempted for the first time that one fails in the presence of a foreign body which might have been extracted, as the experience is not great enough.

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[1] Hildebrand. Sixty-six Magnet Operations, etc. (Arch. of Ophthalmology. Vol. XXIII, Nos. 1 and 2), January, —, April, 1894, p. 167.

[2] Centr.—(Bl. f. prakt. Augenheilk), July, 1894, p. 206.

On the other hand, cases are met with which exceed the limits of surgical intervention, cases in which the foreign body is implanted in the fundus of the eye by multiple projections, and when it has transpierced from side to side the posterior wall of the eyeball.

Again, the foreign body may be so large that it will cause an extensive tearing of the retina, and, in spite of successful extraction, vision can not be preserved. Finally, if before the operation the vitreous already shows traces of suppuration, it is doubtful whether the most skillful operations will preserve the slightest trace of vision.

But, and this is an essential condition of definite success, the operation should be performed as soon as possible. Frequently the presence of a small metallic fragment in the vitreous for two hours is sufficient to induce suppuration in this medium, even when the fragment has been successfully extracted. Enucleation will then be, sooner or later, the last step in the operation.

The surest method, as Hirschberg also says, is prophylaxis, and, in closing, I may say with him what I always tell the numerous workmen whom I have occasion to see: Why do they not take the precaution to protect their eyes with spectacles when they are chiseling or hammering metals, even when they are simple spectators? In this way every year, the loss of many eyes would be avoided, and there would be great economy in the payment of indemnities due to such accidents.

THE INFLUENCE OF COUNTRY AND RACE IN TH ETIOLOGY OF TRACHOMA.

By **SWAN M. BURNETT, M.D., Ph.D.**
Washington, D. C.

A recent article of Doctor Van Millingen in these ANNALES (Se tember, 1895) on the statistics of trachoma is chiefly interesti from the conclusions which he draws from reports gathered by hi from all parts of the world. Conclusious which we beg leave submit are not at all warranted by the facts as set forth in t answers which his correspondents have given to the questions pr pounded and which form a part of his communication.

We are all aware in a general way of the liability of statistics lead astray rather than into the path towards truth and also th their value depends entirely upon who makes them. But asi from the general objection there are several others of a more sp cific character to which those of Doctor Van Millingen are ope one of which is fundamental.

He has not, so far as these published answers show, clearly d fined the disease concerning which he wishes information. It well known that under the term "granular lids" are compr hended at least two diseases of the conjunction which are reco nized by some of our best observers as entirely distinct affection

This distinction, however, is not recognized by all and many st class all granular affections of the conjunctiva under "trachoma. We are not informed whether "trachoma" means the same thi to Gunning of Amsterdam, for example, and to Lagrange of B deaux and Miyashita of Tokio. Gunning tells us distinctly wh he means by trachoma—the chronic form.

Lagrange speaks of an acute form also—as does Miyoshita—b neither of the two latter say whether contagiousness is confined the acute form or not, and certainly confound two phases of disea which many consider distinct.

Conclusions based on such data must, therefore, have but litt value in the minds of those who draw a sharp line of distincti between true trachoma and follicular conjunctivitis.

Medical science has always advanced along the lines of diagn sis and etiology, and in our study of trachoma we can hope accomplish enduring results only on a diagnosis as sharply differentiated as a thorough study of the natural history of the disease will allow.

It is certain that all forms of "granular lids" are not clinically the same and the histological investigations of Raehlmann and others have shown that pathologically there is a difference also. One form may continue for any length of time with no ensuing loss of tissue, while the other always leads to destruction of the conjunctival substance in part or as a whole. This last a number of opthalmologists regard as the true trachoma—a specific disease, while the others they look upon as a simple hyperplasia of the normal papillary structure of the conjunctiva.

These points have not been clearly set forth in Doctor Van Millingan's questions and have therefore not been definitely considered in all the replies. Such being the case it is evident that the answers relating to the question as to contagiousness, effect of altitude, race, etc., on trachoma are of only limited value since there is no assurance of a unanimity of opinion as to the disease in question. Assuming, however, for the time, that all the reporters had in mind the same disease and that it was the genuine trachoma, do they give a sufficient basis for the positive opinion at which Doctor Van Millingen arrives?

These conclusions are as follows:

"I. Trachoma is an infectious and contagious disease which predominates uncivilized (inculté) countries and tends to disappear with the progress of civilization and of hygiene. Hygiene and cleanliness are the best preventives of the disease.

II. Trachoma is not influenced by altitude. It may spread wherever the people are uncleanly and live in misery, quite as easily at altitudes of 1,000 to 5,000 meters as on the plains.

III. All races are equally susceptible to the virus of trachoma. An immunity for certain races does not exist."

We will consider these conclusions seriatim:

1. "Trachoma is an infectious and contagious disease." There were 26 responses to these questions and of these, 13 gave a decided opinion in favor of the contagiousness of the disease, 8 expressed themselves against contagion and 5 were either doubtful or had not sufficient experience to warrant an opinion. Where opinions are so nearly equally divided has any one a

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We will consider these conclusions seriatim:

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right to consider the question in favor of contagion settled a
particularly when the anticontagionists are the growing party?
is a most important fact in this connection that those who do
believe in the contagiousness of the disease are usually those w
make a distinction between true chronic trachoma and acute foll
ular conjunctivitis. Some of the contagionists also mention t
significant circumstance that the discharge, in the acute fo
especially, sometimes produces trachoma in those to whom it
transferred and at other times only a simple follicular catarr
Without doubt bad hygienic surroundings and a purulent infla
mation of the conjunctiva due to any cause whatever, hasten t
devevlopment of a trachomatous attack in those predisposed to i
but that is an entirely different affair from the transference of
specific disease from one eye to another.

All pathological discharges from the conjunctiva are more
less contagious and may excite a conjunctivitis in another eye a
this may lead to the development of a trachoma if that eye is d
posed to the disease: but in order to prove their case to the sat
faction of modern science the contagionists must show the exi
ence of a specific trachoma microbe and definitely create the dise
in a healthy eye by inoculation. This has not yet been done.

2. He states further that "it prevails in uncivilized countr
and tends to disappear with the progress of civilization a
hygiene" and in substantiation of this gives a table in which t
amount of illiteracy of each country is set against the amount
trachoma found among other eye diseases. If this table prove a
thing it proves too much. It shows, for example, that Holla
with an illiteracy of 4 per cent. has 7.05 per cent. of trachon
while Scotland with an illiteracy of 15 per cent. has only 0.7 p
cent. of trachoma, and England with an illiteracy of 6 per cent. h
but 0.07 per cent of trachoma. Clearly then something asi
from illiteracy and the condition of civilization must exist to bri
about such a difference as 7.05 and 0.07 in two countries so nea
on a par in civilization as Holland and England and this son
thing most manifestly is race. Some of the excess of tracho
in Holland, he admits, is due to the large number of Jews in th
country. This, however, is a confession that race has its inf
ence.

3. "Trachoma is not influenced by altitude." While it is

contended that altitude or climatic conditions gives an immunity from trachoma there can scarcely be a doubt that it is much rarer in occurrence at high altitudes and in salubrious climates and runs a milder course. That great clinician Von Graefe was quick to recognize this fact. There are localities where it is rarely or never seen except it is brought there from elsewhere. The reporters from Switzerland, Magdeburg, Wurzburg and Cape of Good Hope all state that the disease is practically unknown to them among the natives. It can hardly be claimed by any one that cleanliness and civilization are virtues confined to those countries. Locality and climatic influences unquestionably play a very large part in the development of trachoma as they do in all diathetic diseases and should be most carefully studied from the standpoint of the therapeusis of the disease.

4. "All races are equally susceptible to the virus of trachoma." If there is one fact that is clearly demonstrated by these reports it is that country and race play a most prominent part in the development of trachoma. What other factor could be so powerful in causing the difference, as given in these tables, between six countries so nearly equal in culture and civilization as Holland (7.05) Scotland (0.7) England (0.07) France (4) Belgium (4) and Switzerland (0)?

We all know that the "curse of the poor is their poverty" but are the poor of Glasgow for instance so much more miserable than the poor of Erlangen and Wurzburg that the former should suffer at the rate of 6 per cent. and the latter practically not at all?

It has long been known that the Polish Jews suffer greatly from trachoma, and the poor particularly of this race wherever they may be are affected usually to a greater extent than those in the same condition of life by whom they are surrounded. Gunning reports that at Amsterdam the Jews have 35 per cent. of true trachoma among the eye diseases, all the others 2.6 per cent. He states however that at Rotterdam where the hygienic condition of the poor Jews is better than at Amsterdam the percentage is not so high.

But the most striking example of the influence of the race on the susceptibility to trachoma is shown in the negroes in the United States.

In Doctor Van Millingen's statistics the only reporters from the

United States, Doctor Howe and Doctor Knapp, both state the fact among their observations that the negro is virtually free from the disease. Doctors Finlay and Santos Fernandez of Havana, corroborate this opinion also. It was in 1876 in a paper read before the International Ophthalmological Congress in New York that I first called attention to this immunity of the negro, and during the 19 years that have intervened and in a dispensary practice, two-thirds of the patients of which are negroes of pure mixed blood I have seen but 2 or 3 cases of what I consider genuine trachoma among them and they were in mulattoes. This is the experience of almost every practitioner in the regions where the negro abounds. The almost universal testimony is that the negro does not have trachoma and those cases that are reported are always open to the doubt of having been follicular conjunctivitis of a severe type, a disease which they not unfrequently have. I have never seen a negro with an entropion caused by cicatricial contraction of the conjunctiva, the result of trachoma.

These facts I have laid before the profession at various times, the last of which was at the International Medical Congress at Berlin.

At the same meeting Doctor Chibret presented a most interesting paper on the immunity of the Celtic race in Europe.

It is unfortunate for the comparative study of diseases in the white and colored races in this country that the reports of the clinics and hospitals do not as a rule make a separate classification of the white and colored patients. In my own clinic I have done so since 1877 and with the result above stated.

In a recently published paper by Doctor Ray of Louisville (*Amer. Practitioner and News*, August 10, 1895) "On the blind of Kentucky based on a study of 175 pupils of the Kentucky Institution for education of the blind," he finds trachoma as a cause of blindness in 12 per cent. among the whites and not a case among the negroes. And yet there is a form of trachoma prevalent in the southern and eastern sections of the state of so virulent a nature that it has received the distinction of "Kentucky trachoma." This is a rural region of native population and but little or not at all mixed with Polish Jews or Italians.

I cannot of course call in question the statements of those well qualified observers who find trachoma among the Africans in Europe or elsewhere. I only state and claim as a fact that the negro in the United States[1] has an almost complete immunity from trachoma and that this immunity is not due to their superior hygienic surroundings as Dr. Van Millingen seems to think. Since the days of slavery many of that race have come to the front and live in good houses with comfortable and in every way healthy surroundings. But with the large majority the reverse is the case. Their habitations are overcrowded and their manner of life is in contravention of every law of hygiene. They suffer greatly from all diseases of malnutrition, and scrofulous keratitis forms a large contingent of their eye diseases. Certainly their social condition is not in any way as good as that of the poor Irish who are so afflicted with the disease. And, by the way, it is unfortunate that there are no special statistics from Ireland in Doctor Van Millingen's report. The south of Ireland particularly, it is well-known, is a hot bed of trachoma and a large part of "American" trachoma is Irish.

But even supposing that there are some Africans who have trachoma, that does not invalidate the fact that race has an influence in the etiology of the disease. Africa is an immense country, and its population is probably no more homogenous that that of Europe, and it may well be that some of its tribes or races have idiosyncrasies and tendencies which others do not.

It is, therefore, no more rational to judge the whole of Africa by those that come from one or two localities, than to accept as a standard European a native of Genoa, for example. It is more than probable that the negroes in this country came from a stock different from that from which those seen in Constantinople sprang. And it may be, too, that those cases of trachoma that have been reported among the negroes in the United States, especially those in the islands off the Carolina coast, may also have been brought from a section of Africa, remote from the district from which the majority of the slaves were imported into this country. As stated in my original paper, in 1876, my attention was first called to this immunity of the negro in East Tennessee, where, during the construction of a railroad, in which both negroes and Irish were employed, the white employees, and especially the Irish, were severely afflicted, while the negroes escaped. The conditions under which all those employees lived were essentially the same, any difference being in favor of the whites.

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[1] The aboriginal North American Indian suffers greatly from trachoma. The 3 per cent. of "Americans" in Dr. V. M.'s statistics can of course have no significance or value as regards race or nationality.

It is a well recognized fact in the large clinics in this country that nationality plays an important rôle in the etiology of tr choma; the Poles, the Italians and the Irish furnishing the lar contingent of the "trachoma brigade." Is it not a signific fact that among the four millions of negroes in the United Sta who were, until comparatively recently, in a state of degrada and slavery, there should be only an occasional case of tracho And is it not fatal to the acclimatization theory that the a riginal races of North America suffer largely from the disease

Viewed, then, in the light of the evidence produced by Van Millingen's reporters, we claim that a proper analysis of testimony leads to conclusions the very opposite to those enu ated by the author of the paper, and that:

1. Trachoma is not an infectious and contagious disease, p and simple. That on the contrary it is the expression of a thesis or constitutional tendency, and may arise *denovo*, or excited by an attack of conjunctivitis of any kind. Nettlesh in his examination of the school children of London, fou numerous instances of "sago grain" granulation in conjunctiv which had not yet shown any signs of inflammation. The f that surgeons and nurses who, it is fair to presume, live clea and under good sanitary condition, are infected while tre ing trachoma patients, is a clinching argument in favor of t existence of a predisposition towards the disease, which on requires some exciting cause as a conjunctivitis to call it forth.

Dirt, filth, unhygienic surroundings and improper living redu the resisting power to all forms of disease, and in the case o trachoma still further increase the facilities for acquiring con junctival inflammation, either primary or by contagion, which hastens the outbreak of the affection.

Improved conditions of living are, therefore, imperative in the treatment and prevention of trachoma, as it is in every other form of diathetic disease.

2. While it is no doubt true that high altitudes do not afford an

entire immunity for the disease, there can be no question that trachoma flourishes, as a rule, much less in the mountains than on the plains, in which particular, as in many others, it bears a strong analogy to tuberculosis. I attach, however, much more importance to race than to altitude in the matter of immunity.

3. There are races which suffer much from the disease, and there are races which are but little affected, and there is one race in one country, at least, which seems to enjoy a practical immunity from its ravages.

If these are facts, and we submit that the testimony of Dr. Van Millingen's reporters substantiate them, then our attitude toward trachoma must change in the matter of etiology and therapeutics.

We must no longer limit our attention therapeutically to the conjunctivitis, which is merely a symptom of the disease, and treat it only by caustic and astringent applications. We should seek to remove the diseased adenoid tissue by surgical procedure, and on the same principles that the surgeon removes tubercular glands. Under this view the "mechanical" treatment of trachoma is the only rational one.

We entirely agree with Dr. Van Millingen in regard to the part played by unsanitary conditions, though not as to the manner of their action; and both for the prevention of the disease and its thorough cure, when established, these conditions should be changed as radically as possible.

Patients should be placed in good hygienic surrounding and removal to a high altitude, if for no other reason than its purer air, should be accomplished when practicable.

It might be said that then, after all, the practical result is the same under the one view as under the other. But there is this most important difference that under the one a clean differential diagnosis and a clearer conception of the nature of the disease, and a more enlightened knowledge of its etiology, must inevitably place us upon a higher vantage ground as to the future study of therapeusis and general management of a disease which forms so large a per centum of serious ocular affections.

LUMINOUS PERCEPTION IN THE PERIPHERY THE VISUAL FIELD.

By **Dr. G. AHLSTROM,**
Gothembourg. Sweden.

The peripheral portions of the retina, like the central portion this membrane, the fovea, present three different functio namely : the luminous sensation, sensibility to colors and app ciation of forms.

Numerous investigations have made us familiar with the sen tion for colors and the sense of appreciation of forms in periphery of the retina, but the same is not true of the lumin sense. I have, therefore, undertaken investigations of this fu tion in the different parts of the retina, and desire to present h my results and to form a comparison between the luminous p ception in the peripheral portions of the visual field, and that the centre.

The luminous sensation, that is to say, the sensitiveness to t light of the visual apparatus, the capacity of observing differen of brilliancy (Aubert), is measured by determining the limits objective luminous intensities capable of being distinguish This fact, as is known, may be sought in two ways, either determining exactly the amount of light necessary to produc sensation (Reizschwelle), or by measuring the difference betwe two luminous intensities which can be appreciated as possessing different brilliancy (Unterchiedsschwelle). However, if the two methods of examination are carefully compared there will b in my opinion, no essential difference between them, for employing the first method, there are also two different impressio to compare, namely : on the one hand, the sensation whi exists when one is not exposed to any objective luminous excit tion and is in darkness ; on the other hand, the sensation exp rienced when a given luminous stimulation takes place. Eve investigation of the sense of light will, therefore, aim more or le at determining the '' Unterschiedsschwelle.''

Investigations of this kind to determine the functional co dition of the luminous sense in the periphery of the visual fie have been made by various observers. However, on account certain circumstances observed in the examination of the centr sense of light in my patients, and concluding that the condition of the peripheral luminous perception could not in all cases be understood from the theories now current, I decided to undertake these investigations. As the methods of examination which have been employed were not altogether satisfactory, I employed a somewhat different method in my experiments.

Before speaking of my experiments, however, I wish to review the preceding methods of investigation and the results which have been reached by them.

Among the first of those who examined the peripheral luminous perception by a scientific method was Aubert[1] and he preceded in the following manner: Opposite a well-illuminated window, he placed a piece of white paper, 1 centimetre square, on a black background and at distance of 25 centimetres from this square in the 4 cardinal directions similar points of fixation. The eye was situated in the centre of a segment of the circle indicated by the 5 points, the radius of which was 1 metre. He then compared the brilliancy of the paper square when he looked at the different points. The square evidently appeard somewhat darker on indirect fixation. He did not believe that this was dependent on a diminution in the capacity of the luminous perception of the periphery, but that it was due to several causes, for example, that the eccentric portions of the retina received less light from objects. Furthermore, that one is inclined to consider sharply defined images clearer than those which appear less distinct, as the image in the periphery of the retina always are, and finally that the peripheral portions of the retina always give a somewhat greyish shade which renders comparison with the centre more difficult. He, therefore, concluded that the luminous sense was the same throughout the entire extent of the retina.

Charpentier[2] arrived at results which were almost the same. In his experiments he employed his photoptometre. This apparatus is composed of a box of rectangular form, closed at the two extremities with plates of ground glass. One of these, serving as the luminous object, is illuminated by daylight and is placed in the opening of a window shutter, the rest of the room being in perfect darkness. The other glass acts as a screen to receive the image which is to be examined by the observer, and is in the form of a square with sides 3 centimetres long. These two plates of glass are placed in the two conjugate foci of a biconvex lens which is placed between them and through which the light passes. By means of an opaque screen a large or small portion of the periphery of the lens can be exposed, and it is possible to obtain a proportional darkening of the image formed on the glass directed towards the person examined. The degree of illuminating of this image was considered as the expression of the quantity of light which passed through the uncovered portion of the lens. In order to diminish the illumination as much as possible, seven sheets of ground glass and two sheets of white paper were placed in front of the end of the apparatus, acting as luminous object. The observed person was at a distance of about 1 metre from the other extremity of the apparatus. In spite of the great diminution in the intensity of the light it was only necessary to leave exposed 1 centimetre, sometimes only half a centimetre square of the lens to obtain an image bright enough to produce an impression of light on central fixation. Then the eye was turned 45° inward and outward from the luminous image, so that the latter was situated respectively in the external and internal portions of the visual field. It was then found that the minimum illumination necessary to produce a luminous impression in the periphery the visual field was the same as in central fixation.

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[1] **Aubert. Physiologie de la retine.** (Graefe Saemisch's Handbuch der ges Augenheilk.)
[2] **Charpentier. (Archives de Physiologie, iv.)**

Charpentier therefore concluded, in confirmation of Aubert's opinion, that the sensitiveness to luminous impressions was the same in all of the different parts of the retina with the exception of the most peripheral.

Schadow[1] also investigated this question. In his experiments the luminous object was a candle contained in a carefully closed box, in one of the sides of which, near the flame of the candle, and separated from it by a ground glass, was a square opening, which could be enlarged and diminished at will. Opposite this box was a photometric apparatus composed of a tube with two Nicol prisms, one of which could be revolved. In this way the quantity of light passing through the prism could be regulated, and the degree of rotation exactly noted on a scale. At the extremity of this tube was placed another plate of ground glass in order to diminish still more the illumination. The illuminated surface which was to be observed by the examined person was diminished to 3 millimetres square by means of black paper fixed to the ground glass. Under the extremity of the tube above described was placed an arc of a Forster perimeter, in the centre of which the observer's eye was placed. A small piece of phosphorus attached to the arc was used as object of fixation. Schadow performed his experiments in a perfectly dark room, and after adjustment he turned the prism, which was at first placed at o degree until the observer experienced a luminous sensation. The angle of rotation was then observed by an assistant, while the person experimented upon closed his eyes. In this way the central sensibility to light was first examined, and afterwards the peripheral. Particular attention was given to the horizontal meridian. The experiment indicated, that in order to produce a luminous sensation in a point of the retina situated 60° within the fovea greater luminous intensity was required than for the fovea itself, while on the other hand, the luminous perception at a point situated 30° within the fovea was excited with less intensity of light than in the centre. This, however, did not occur unless the fovea centralis was free from luminous impressions, for otherwise the peripheral sensibility was considerably diminished.

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[1] Schadow. (Archiv. für die ges. Physiologie, XIX, 10, 11.)

Butz[1] employed the same method in his investigation and he also concluded that a luminous impression could be produced at a point situated 30° within the macula with a less intense light than at the centre. But, on the other hand, he found, contrary to Schadow's conclusions, that to produce luminous perception at 60° within the fovea, the same luminous intensity was required as at the centre.

From all these experiments, this general opinion is obtained that the luminous perception is almost exactly the same throughout the entire extent of the visual field, and consequently, that the luminous intensity necessary to produce a sensation will be the same for the entire retina, and even somewhat less near the fovea centralis than in the fovea itself. Peripheral luminous perception would then be no less than central perception.

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[1] Butz. (Untersuchungen über die physiologischen Funktionen der Periferi der Netzhaut.)

However, if these preceding methods of investigation a amined it will be found that none of them are free from crit This is especially so of that first described (Aubert's metho it is too subjective to have any special value. The same cri might be made to the investigations of Dobrowolsky and C who, in their investigations employed a Masson's disk pla different points within the visual field. These authors mad clusions contrary to those of Aubert.

It should also be stated that the objects of examinatio were too large and the experiment too gross to obtain exa sults. In a certatn measure, this might also be said of the method, for in examining a function, such as the percept luminous impressions to which the eye is extremely sensi think that it is necessary to reduce to the minimum the lun intensity necessary to be observed by the visual apparatus, dition which Carpentier and Schadow attempted to realiz also that the visual angle under which the luminous object served be as small as possible. This requirement cannot be fied even by the methods of the last two observers.

Schadow's experiments were made with a Forster peri the radius of which is 30 centimetres, and an object 3 milli square. The visual angle in this case was therefore about 3 utes and relatively large. As for Charpentier's experime luminous object, as I have said, was 3 centimetres square a distance between the object and the person examined was 1 metre. The angle under which the image was observe then about 1° 42 minutes. His investigations should b sidered then as less satisfactory.

Another criticism of the value of Schadow's experiments i in most of them he employed a piece of phosphorus toward the eye was directed in order to obtain fixation. But in thi the eye was not strictly adapted, for however small this lun object may appear, it is sufficient to render the results of t amination uncertain. This is a fact to which I will retur in considering my own experiments.

Thus there are various objections to the methods of the servers. I have endeavored as far as possible to overcome objections and proceeded in the following manner :

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1. Dobrowolsky, Gaine. (Arch. für die ges. Physiol., XII.)

As luminous object, I employed a small electrical lamp in the form of a horizontal cylinder, one side of which for about 1 centimetre was of glass, and the rest of metal. To this lamp a number of perfectly fitting metal caps could be applied entirely covering the glass side, and only allowing the light to pass through a small opening in the centre, which was of different size in the different caps. The lamp was illuminated by an electric current from a battery composed of many cells, a greater or less number of which could be joned in the current by means of a switch, so that the force of the current and consequently the luminous intensity could be varied at will. The different degrees of luminous intensity which will be explained later were naturally only of relative value and could only be compared among themselves. In these experiments it was not possible to observe the force of the electric current by a galvanometer.

One fact, which I wish to accomplish, was to obtain a luminous source as small as possible in order that the visual angle under which it was to be observed could be diminished to the minimum. My idea was to move the lamp on an arc of a perimeter, and in this way to examine the different portions of the retina. However, as the radius of the ordinary Forster's perimeter is 30 centimetres, the luminous object is at too short a distance from the eye for these experiments, for even the smallest opening in the lamp appears under too large a visual angle. This arc could not then be employed, and I therefore had one made with a radius of 2 metres. The lamp could be readily moved on this, and notches were made every 10 degrees, so that the position of the lamp could be learned with the finger without the necessity of having light for the observation.

Several difficulties arose in the effort to keep the eye sufficiently in fixation, as for the reason stated above, I did not wish to use any luminous object whatever. In my first experiment I endeavored to have the eyes assume the primary position, but these experiments were unsatisfactory. This might be caused by quite considerable differences in their position. I found that the latter fault did not exist in the extreme direction, as in these cases the person examined always placed their eyes in almost the same position of examination. If the eye be directed straight upward, downward or to the side, it very satisfactorily takes its place in

the vertical meridian and then in the horizontal meridian, a f
which is verified by observing the reflections on the cornea o
small lighted candle moved along the arc of the perimeter. I
true that a difference of a few degrees may sometimes occur in
ferent experiments, but small inequalities can be of no importa
in the examination in question. The position of the eye tur
upwards appears to be the most constant. The other eye
always covered with a bandage.

In order to employ my perimeter arc in these directions of
gard, I had another arc made also with a radius of 2 metres, a
on the front of which the first arc could be moved. For t
purpose the anterior arc was so arranged that its zero was on
degree of the posterior arc corresponding to the limit of the vis
field.

Another difficulty consisted in maintaining the head in fixati
during the entire experiments which were somewhat long. I fi
tried the ordinary method, that is a support under the chin,
this soon proved uncertain. I then constructed a special fixati
apparatus with which the head was held by the temples, the su
mit of the head and under the chin.

For greater precaution and in order to maintain the head in t
same position during the entire experiment, I placed an apparat
between the head and each one of its points of support, whi
immediately indicated if the head moved. This apparatus w
made of two very thick plates of tin about 10 centimetres squa
one of the borders of which was attached to a wooden fram
from which they projected one parallel to the other at a distan
of 1 millimetre. Each of them was in communication with
electric battery and a bell. They were attached to the supp
above described and during the experiment were placed in co
tact with the respective portions of the head ; the surface towa
the head being padded. If the head moved in the slightest degr
the metal plates were immediately brought in contact and the b
announced what had taken place.

Experiments.—I first examined myself: I am emmetropic with S
$\frac{8}{8}$; my visual field extends about 48° in every direction. After pl
ing my head in the fixation apparatus described above the zero poi
of the perimeter arc, where the lamp was situated, was placed op
site my right eye which was in the centre of the arc. Then the in

rior perimeter arc was moved upward on the exterior arc to 48°. Twenty minutes was taken for adjustment in a perfectly dark room. The opening of the lamp was extremely small, no larger than the finest needle point. At first the lamp was made to glow weakly with four cells in action and these only having the metals partly immersed in the electrical fluid, and, in this case, I was able by central fixation, the eye then being directed upward, to just perceive the slight glow. The current was interrupted and ten minutes was taken for adaptation during which the lamp was moved outward 40°.

The eye then resumed the former position and the current was turned on. At that time almost no luminous perception was produced; I thought, but was not sure, that at times there was a very weak sensation but in any case it was much weaker than central fixation. I then added another cell and a distinct luminous point appeared outward in the periphery. Ten minutes was then taken for adaptation and the lamp moved 20° further outward, it being now at 60° on the temporal side. The current was turned on but no light could be observed. If after again interrupting the current, the lamp was placed in its first position, that is 20° nearer the point of origin, and was there illuminated, the light could again be observed but not when it was replaced at 60° (the current being interrupted during displacement) until the luminous intensity had been increased by the addition of two cells, a single additional cell not being sufficient. If the lamp was placed at 80° in the outer periphery no light could be observed even with seven cells in action and it was necessary to add two more to produce a sufficient luminous intensity. Hence it follows from these experiments that the luminous perception is uniformly diminished toward the periphery in the nasal portion of the retina.

I then examined the condition of perceptions in the temporal portion of the retina. I commenced, as in the preceding observations, by determining the smallest luminous intensity which could be distinguished by the eye on central fixation, and in this case also it was produced by four cells in action. After ten minutes for adaptation, during which the lamp was moved inward 30°, the current was turned on. As was the case in the corresponding part of the temporal portion of the visual field, no distinct luminous perception was produced here by means of the illumination stated. When the number of cells had been increased to five, the eye could readily observe the light. If the lamp was placed at 50° and there illuminated, no light was perceived by the eye, but this did occur if after interruption of the current the lamp was replaced at 30° and the current turned on. At 50° the light was observed by the addition of two cells. Therefore, in this part of the retina also, a greater luminous intensity is necessary to produce a luminous sensation in proportion as the part examined is nearer the periphery of the retina.

The same result was obtained on examining the vertical meridian of the eye. When the lamp was at 30° below it was necessary to increase the force of the current in order that the eye might perceive a slight luminous impression, and at 50° the number of cells required was six. In investigating the lower portion of the retina it was naturally necessary to change the position of the eye, directing the regard as far as possible straight downward, which position, from the comparisons previously made, corresponded to 48°. As in the preceding case, it was found that the sensibility to luminous impressions in this part of the retina diminished toward the periphery of the visual field. An identical result was obtained on examining my left eye and the results were confirmed by other experiments on my own eyes.

I wish again to state that the number of cells employed, which may be considered as the expression of the luminous intensities, have only a relative value and can only be compared with each other. Also the numbers of degrees in the visual field given here can in no way pretend to define distinct limits ; they only indicate approximate relations.

Similar investigations were made not only on myself but also on a number of other persons and the following are some of the results obtained :

M. G.—Left eye. Myopia 1.50, $S = \frac{6}{6}$. Central fixation, 4 cells in action. If the lamp was placed 30° inward, 5 cells were necessary. At 40° outward, 6 cells were required to produce a distinct luminous perception.

Dr. F.—Right eye. Emmetropia, $S = \frac{6}{6}$. Central fixation, 5 cells. 30° upward, 6 cells. 30° downward, also 6 cells.

M. S.—Left eye. Hypermetropia, 2.00, $S = \frac{6}{9}$. Central fixation, 5 cells. 30° above and outward, 6 cells. 50° below and inward, 8 cells.

Dr. R.—Left eye. Myopia, 3.00, $S = \frac{6}{6}$. Central fixation, 6 cells. 40° upward, 8 cells. 50° inward, also 8 cells.

M. A.—Left eye. Emmetropia, $S = \frac{6}{6}$. Central fixation, 4 cells. 30° outward, 6 cells. 40° inward, 7 cells.

I might mention still more similar investigations practised on other persons as well as experiments repeated on myself but in all cases identical results were obtained and I do not think it necessary to fatigue the reader.

From all these experiments it follows that *the sensibility to luminous impressions is not the same throughout the entire extent of retina, but that it is greater in the fovea and the neighboring parts and that it diminishes uniformally outwards toward the periphery.*

It will then be seen that, from what I have just stated, my investigations of the luminous perception in the periphery of the visual field produced quite different results from those obtained by those who have written on this subject. The reasons for this may be multiple.

As I have already shown, Schadow, as well as Charpentier, employed relatively large objects in their experiments, while in mine I attempted to reduce them as much as possible. This last condition is necessary in order to obtain exact results. In order, in some measure, to imitate the methods of the observers mentioned, I took off the metal cap from the incandescent lamp so that the luminous source attained a size of a centimetre square. The lamp was placed at a distance of 1 metre, and the visual angle was then about 34°. By placing a dozen plates of ground glass in front of the lamp the luminous intensity was diminished so that by the use of two cells it was sufficient to be observed on central fixation.

Schadow's luminous source was 3 millimetres square, and I also reduced mine to this size. I then proceeded in the same manner as has been described, but, as before, no difference in the luminous perception could be found between the central and peripheral portions of the retina. The same conclusion was reached if an opening of 1 millimetre square was used on my lamp. Even then no distinct difference could be noted in the various portions of the visual field in relation to the necessary luminous intensity. To judge from these experiments I, therefore, would have reached the same results as the observers mentioned, namely: that the luminous perception was the same throughout the entire extent of the retina. But, unquestionably, this is not the case according to the experiments which I made with a very small luminous object and which were described above. The difference between the results of my preceding experiments and those just described can only be found in the fact that in my first experiments the image which appeared on the retina was particularly small, only involving a relatively inconsiderable number—or, it is possible, only a single one—of the elements of perception there fou while in the following ones, conformable to the investigations the observers before mentioned, the image on the retina cover a fairly extensive space. The phenomenon may be considered if it were formed of a large number of small images side by si each one of which by itself would not suffice to produce a sen tion in all the points of the retina if it were not aided by t influence of the neighboring one. There can certainly be question of large differences in the various portions of the reti but, however, they are sufficient when particularly small a weakly illuminated images are under consideration.

Schadow[1] also concluded that the retina 30° within the fov was more sensitive than the fovea itself. He based this idea the fact that when he fixed his luminous source, and the lumino intensity was diminished to just the point where no lumino sensation was experienced, such a sensation was again produc by turning the eye 30° inward. I also attempted to repeat t experiment by using an opening ½ millimetre square applied the anterior surface of my lamp. I also diminished the lumino intensity so that it was as small as possible, but not once wa able, when all luminous sensation had entirely disappeared at t centre, to experience any on turning the eye in the stated dir tion. But if, on central fixation, there was only just enou light so that I could perceive it only by a great effort, and if th I turned the eye 30° inward, it certainly seemed to me that in t latter case the light was a little brighter than on central fixati I cannot, however, accept this fact as a proof that the lumin perception at the fovea is less than that which exists 30° wit it, but this may depend upon two circumstances. First, the ret may be fatigued at the centre from fixation of a weak lumin source. Schadow thought that he could exclude this possibil by means of the method employed in his investigations. Wh only a trace of luminous perception was present, he turned t prism from ½° to 1° backward, thus diminishing the lumino intensity still more. Then the observation was made while t person examined closed the eyes, and he then found that luminous sensation was experienced on central fixation but o when the eye was turned to the side. However, in spite of th observation I do not think that one can exclude the possibility of the retina having become fatigued at the centre.

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[1] Schadow (*Loc cit.*)

I can not tell with certainty how much time was required to turn the prism and observe its position, but probably this only required a quarter of a minute at the most. When, in my last experiments, I closed the eye for a short time, and then again observed the very weak luminous source, it was certainly very difficult for me to perceive it; it was undoubtedly more easily seen if I turned the eye a little to the side, but then it was also easily seen whether I turned the eye inward or outward, upward or downward. If, however, I kept the eye closed for five minutes, no difference whatever could be found in the luminous intensity, whether the image fell on the fovea or eccentrically on the retina, but in all cases the same illumination was necessary. If one does not wish to consider fatigue of the retina as the cause of the fact that the luminous perception is more readily produced on rotation of the eye than on central fixation, this may be explained by the simple fact of the rotation. The same thing will take place if a movable object is employed to which, as being known, the retina is extremely sensitive. One cannot, therefore, in this case, obtain exact results as to the luminous perception, for small objects, which cannot be observed if the eye and the object are at rest, may be easily perceived if they are placed in motion. This was also the reason why, in my first experiments, I interrupted the electrical current between each displacement of the lamp. If I omitted this precaution and moved the lamp along the arc of the perimeter the small light could be observed almost without being changed in the entire extent of the visual field, at least it could only be made to disappear much nearer the periphery than when I interrupted the current and when the lamp was again illluminated at a point in the visual field which the person examined did not know in advance. In the latter case, as I have already stated, the luminous perception indicated a constant diminution towards the periphery.

In order to discover the influence which a luminous fixation object might exercise on peripheral luminous perception, I employed for fixation a von Graëfe lamp with an opening 1 millimetre square, placed close beside the o point of the perimeter arc. On observing this luminous source while the electric lamp was situated in the periphery, I was able to demonstrate that it w necessary that the force of the electrical current be greater order to perceive the eccentrically situated light than when, aft turning the eyes a little to the side, both luminous objects we placed somewhat peripherally in the visual field. This, I think, m be readily explained by the fact that a luminous source situat peripherally has not as great an influence on the adjustment the eye as another, which is the object of central fixation. Co sequently, if the eye has fixed the luminous point it should, co formable to what occurs in each unadjusted eye, have great difficulty in perceiving smaller luminous intensities.

When central fixation ceases, more favorable circumstanc again present themselves, but, in this case also, it must be co sidered that rotation of the eye is necessary, for this is the reas why the luminous source could be more readily observed. A the fact that one sometimes thinks that he sees an object p ipherally situated more clearly than on central fixation may be ve well explained because the peripheral portions of the retina are i more suitable condition of adjustment than the fovea centra and the neighboring portion. Conclusions, however, cannot drawn from this as to the power of the luminous perception different portions of the retina.

In fact, for this purpose, it is necessary that the investigati be carried on with the greatest exactness possible, that only o luminous object be employed not only of very weak lumino intensity, but also of the smallest possible dimensions. By usi such a method I have been able to show that the power of t luminous perception diminishes uniformly from the centre towa the periphery. This, then, is in accord with what is known the other functions of the retina.

ON THE USE OF DRY DRESSING AND DRY TOPICAL POWDERS IN THE TREATMENT OF OCULAR AFFECTIONS.

By Dr. **ROGMAN,**
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The unfavorable influence which bactericidal agents, which are now in use, manifest in contact with the delicate tissue of the organism has brought about both in general and special surgery a movement in favor of simple asepsis.

Even in infections already established it has been recognized that under many circumstances it is advantageous not to attack the microbial element from in front, but that it may be combatted with greater chances of success by endeavoring to prevent its development by sterilization of the territory where it is developing, and increasing the means of defense of the organism.

Several methods of treatment have been devised to realize these conditions. One of them is based upon the maintenance of surfaces in a dry condition and the use of dessicant dressings and remedies.

The following interesting and suggestive experiment performed by Leber[1] shows to what degree humidity is favorable to the proliferation and development of lower organisms. By applying a pure culture of the microbe of phlyctenular ophthalmia to the intact and sterilized skin of the arm, the distinguished Heidelberg professor succeeded in provoking after a few days an exanthema quite similar to scrofulous eruption by the simple precaution of maintaining a certain amount of humidity around the culture. This fact, as Leber remarks, is nothing more than an experimental reproduction of the observation made daily of the extension of cutaneous eruption in parts which are moistened by infected secretions from the conjunctiva and the nostrils.

Schlange[2] demonstrated the same fact by a laboratory experiment. He filled a glass cylinder with gelatin, above which he placed a layer of sublimate or simply sterilized gauze, 8 centimetres thick, and, after soaking this with meat juice or Koch bouillon, he inoculated the surface with the bacillus pyocyaneu If after this inoculation evaporation was allowed to take plac freely, he observed that the culture only extended to a ver limited degree. If, on the contrary, the cylinder was cover with an impermeable material, the bacilli development progress with all its proper characteristics in a few days to the deepe layers. After the germs had penetrated to a depth of severa centimetres, if free evaporation was again permitted, the germ process was rapidly surpassed by the zone of dessication and then all further vegetation was arrested.

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[1] Leber. **Transactions of the International Ophthalmological Congress at Heidelberg** 1888, p. 358.

[2] Schlange. **Ueber sterile Verbandstoffe. (Arch. f. klin. Chirurgie, XXXVI 4, 910.)**

As humidity then is such a necessary element for microbial development, the inverse result is that substraction of fluid is a method of sterilization, the efficacy of which can not be doubted. In the interesting report which Nuel[1] presented to the French Society of Ophthalmology in 1893, he properly emphasizes the value of absorbant applications to the surface of wounds, and does not hesitate to make the apparently paradoxical proposition that he prefers an absorbent and even slightly infected dressing to one which is aseptic and not absorbent.

It is under the special conditions of asepsis obtained, after previous disinfection, by removal of fluids that, in general surgery and in gynecology; Sanger (Leipsig), Landerer (Leipsig),[2] V. Bergman (Riga)[3], E. Kurz and others have established a particular operative method which consists in maintaining the surfaces of wounds during and after operation in a condition of perfect dryness, a method which has given remarkable results.

The use of dry occlusive dressings introduced into ophthalmology by Valude [4] from the indications of Gama Pinto in the treatment of infectious ulcers of the cornea is dependent on the same principle[5]. Although the recent experiments of

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[1] Nuel. (Bull. de la Soc. franç. d'opht., 1893, p. 55.)

[2] A. Landerer. Trockene Operationen. (Arch. f. klin. Chir., XXXIX, 1 216.)—Trockenes Wundverfahren. (Wiener Klinik, February 2, 1890.)

[3] V. Bergmann. Ueber die trockene Wundbehandlung. (Petersb. med. Wochenschir., XIV, 52.)

[4] Valude. (Acad. de Med. de Paris, February, 1891.)

[5] The moist occlusive dressing such as Julq has been employed in the clinic of Professor Schiess-Gemuseus at Bale (E. Julq. Le pansement occ usif humide dans les maladies des yeux, Nancy Thesis, 1891), act like cataplasms and are not here under consideration. Furthermore, in the words of the author they are contra-indicated in cases of destructive processes in the cornea with strong tendency to spreading both in breadth and depth, that is, in the cases where dry dressings are of the greatest importance.

Marthen[1] and Bach[2] seen to show that occlusion of the eyes by dressing either antiseptic or simply aseptic provoke in almost the same degree a marked increase of the bacteria in the conjunctival sac, facts show that this method of treatment succeeds in arresting infections where the most energetic antiseptics, even cauterizations, have failed. Should the reason for such a result be sought in the fact that, if on the one hand, the eliminating causes of germs to which Leber[3] has called attention, are lacking, on the other hand, the tissues of the eye are in conditions more favorable to strive against micro-organisms? The discoveries of Marthen and Bach in any case show us that one desideratum which a dry dressing should fulfil is that its dessicant action should penetrate deeper into the conjunctival sac.

In the domain of ocular therapeutics in general, not considering palpebral and cutaneous affections, it would seem that as yet but little attention had been given to the harm which may arise is certain cases from the contact of fluids with diseased parts. In recent literature de Wecker is the only person who, in an article on partial suppression of collyria[4], mentions the dangers which may result from their use. In fact, the usefulness of maintaining surfaces dry where an infectious principle exists can not be different, whether the origin of the infection is of traumatic or surgical nature, or whether it is of ordinary pathological development.

The methods as yet employed for the purpse of obtaining dessication have consisted of various forms of bandages, absorbent cotton, lint and gauze. Topical powders, at least in ophthalmology, have been much less frequently employed. The medicinal agents which have been employed in this form are, according to Weeks[5]: calomel, resorcin, napthol, iodoform, iodol, chrysophanic acid, subnitrate of bismuth and boric acid, to which

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1. Marthen. Experimentelle Untersuchungen über Antisepsis bei Augenoperationen und die Bacteriologie des Conjunctivalsackes. (Deutschmann's Beiträge für Augneheilkunde. Vol. I, p. 154.)

2. Bach. Bacteriologische Untersuchungen über den Einfluss von verschiedenen speciell antiseptischen. Verbänden auf den Keimgehalt des Lidrandes und Bindehaut- (Arch. f. Aug. Vol. XXI, p. 179.)

3. Leber. Die Bedeutung der Bacteriologie. (Transactions of the International Ophthalmological Congress at Heidelberg, 1888, p. 348)

4. De Wecker. La suppression partielle des collyres. (*Ann. d'Ocul.* Vol. CXI, p. 401.)

5. Weeks. Bacteriologische Untersuchungen über die in der Augenheilkunde gebrauchten Antiseptica. (Arch f. Aug. Vol. XIX, p. 118.)

should be added aristol employed by Heuse[1], loretin and loret-nate of bismuth introduced into ophthalmology by Nicati[2] an several products formerly employed, such as neutral acetate lead[3]. But of all these preparations, except the second, which i of quite a different order, it was intended to utilize before al their antiseptic properties, and of some only in a secondary way, their absorbent or modifying action.

To act properly as dessicant absorbents topical powders should be free of water, sufficiently antiseptic to render the infectious fluids which they absorb inoffensive, and finally, possess a restrictive action on the secretion of the membranes with which they are in contact.

On searching a product which would fulfil these conditions, my attention has been called to tribasic sulfo-salicylate of bismuth, to be had commercially from the house of Speyer and Grund (Frankfort-on-the-Main) under the name of thioform and of which Professor Hoffmann (of Stuttgart) in a series of communications has just demonstrated the therapeutic value[4].

In the presence of organic fluids thioform, according to Hoffmann's experiments seems to separate into an insoluble portion, the detrabasic sulfo-salicyclate of bismuth, and a soluble portion, sulfo-salicylate acid, possessing the antiseptic properties of bodies in the nascent condition. The chemical characteristics of the latter are clearly shown clinically as I hope I have demonstrated in a preceding article[5]. As such they may be advantageously compared with all the other analogous bodies ordinarily employed.

Thioform is a very light and almost impalpable powder, and is an energetic absorbent. Powdered on the inflamed conjunctiva, it diminishes secretion more rapidly than all the other astringent or modifying preparations in solutions or as ointments.

It should not, however, be forgotten that, especially when it

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1. Heuse. Aristol in der Augenheilkunde. (Therapeut. Monatsh. February, 1895.)
2. S. Petri. Du pansement oculaire pulvérulent occlusif au lorétinate de bismuth. (*Paris Thesis*, 1895.)
3. Buys. De l'emploi de l'acétate de plomb solide dans le traitement de l'ophtalmie granuleuse. (Arch. belg. de méd. milit., June, 1849.)
4. Berliner thierärtzlichen Wochenschrift. 1893, Nos. 6 and 11; 1894, No. 4.
5. Rogman. Le thioforme dan la thérapeutique oculaire. (Flandre médicale, August 23, 1894.

is first applied, thioform produces a certain amount of irritation, varying according to the patient, but perfectly well supported in the great majority of cases, an irritation of short duration, and frequently not noticeable after several days use. On account of this inconvenience it should be used with great care in cases where a momentary blepharospasm might be dangerous, for example, with large openings in the eyeball. Under all other circumstances the results obtained quickly compensate for the first disagreeable feelings. For my part, I have never regretted its use.

To fulfil the indications which I have mentioned above, thioform seems to be an agent of the first order to free the surfaces of the eye from fluids which bathe them, soften them and infect them, to preserve them from micro-organisms, for which the borders of the lids are veritable nests (Cuenod[1] and Bach[2]) to prevent the infection from spreading and to destroy the infection, by exerting its dessicant action, not only on the exterior surface of the lid by the palpebral fissure, like the different absorbent dressings, but also in the depths of the conjunctival folds. I have employed it many times in insufflations in the eye once or twice a day, according to the severity of the case and the tolerance of the patient in quantities at first very small, but greater after the first days.

The affections in which this method of treatment has been useful are as follows:

In infectious ulcers of the cornea insufflations of thioform are a most valuable complement to the dry dressings of Valude. They are almost indispensable when, as is very frequently the case, the diseased portions are constantly covered with secretions. The good results which they produce and which I have frequently observed are perfectly explained by the remarks on the multiplication of bacteria under the influence of dressings. These results far surpass those obtained by iodoform. These insufflations are also very useful under the same circumstances without the use of occlusive bandages, when for example, the latter are contraindicated on account of too abundant secretions. A single clinical case will lend weight to this statement. Quite recently a woman with entopion of the lower lid, twelve days after a cataract extraction, developed a slight hypopyon without marked reactionary symptoms, and in spite of the use of iodoform. The substitution of thioform for the latter succeeded in a few days in removing the complication.

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[1] Cuenod. **Bacteriologie et parasitologie clinique des pauperies.** (*Paris Thesis*, 1894.)
[2] Bach. **Loc. cit.**

In conjunctivitis and phlyctenular keratitis, especially in the mixed forms with catarrhal manifestations, thioform produces a better effect than the compounds of the mercuries.

It is an excellent remedy in the various forms of scotoma characterized by papillary granulations and abundant secretions, especially when in this disease the cornea is affected or threatened with complications, which, as is known, develop from extension of the infection.

It surpasses all other forms of medication in suppressing the secretions resulting from the use of an artificial eye.

Finally, as Leber's experiment described above would seem to foretell, it succeeds admirably in the treatment of the blepharitis of eczematous or impetiginous nature.

From the properties which it possesses it is evident that thioform would also be applicable in many other affections, for example, in purulent ophthalmia. The satisfaction obtained from the ordinary methods alone explains why it has not been employed in such cases.

II.—REPORTS OF SOCIETIES

SOCIETIES

OPHTHALMOLOGICAL SOCIETY OF PARIS

Session of March 3, 1896. .

Detatchment of the Retina and Iritis.

DR. JOCQS had again seen the patient whom he mentioned on the occasion of Dr. Parinaud's communication (see the last number, p. 116). It is now two months since the puncture was made, and the recovery has been permanent, but this patient presents certain peculiarities which are worthy of interest. After the first puncture a tight compress bandage was applied. Two days afterward, as the patient had had some pain the bandage was removed, and a posterior synechia was found, a sign of slight iritis. After fifteen days the patient went home with another compress bandage. She again had some pain, and when she returned in a month more, synechiæ of the iris had formed. Dr. Jocqs is persuaded that this iritis was caused by compression, still more so, as seven years before, in a patient with detatchment of the retina, who had not undergone surgical treatment, he had observed the development of an iritis with synechiæ, as the result of the application of a compress bandage In this case the iritis was accompanied with a keratitis, similar to that observed in cases of keratoconus, treated with a compress bandage.

Dr. Despagnet does not think that compression has any action in the production of iritis Detatchment of the retina is a sign of choroiditis, and we know that choroiditis is frequently accompanied with iritis. Compress bandages are frequently employed in other cases than detatchment of the retina, and no iritis is observed in such cases.

Dr. Duboys de Lavigerie.—In a patient whom I treated by electrolysis, I saw a slight iritis develop, which I attributed to arthritism.

Dr. Chavellereau.—I have treated a patient with keratoconus by strong compression with an elastic bandage for a year, and have seen no iritis develop. I do not believe in the influence of compression.

Dr. Jocqs.—What leads me to believe in the action of compression is the fact that the iritis was only arrested when the bandage was suspended, and reappeared later when it was again applied.

Suture of the Lids as Treatment of Certain Septic Affections of t Cornea.

DR. KALT.—There is a series of forms of infectious keratitis torpid progress characterized by superficial ulceration of the corn and conjunctival irritation.

Ordinary antiseptic treatment acts but slowly, the occlusive ban age is not well supported, and causes redness and oedema of t ciliary border, and exaggerated conjunctival secretion and an alan ing microbial development.

Similar ulcerations develop on cornea, very superficially burn with lime, ammonia and various acids. Anæsthesia is almost co stant and lasts for months. Again, this anæsthesia is due to p ipheral neutritis, without the ordinary symptoms of herpes. T ordinary termination of these ulcerations is an indelible opacity of t cornea. Finally, as the result of deep wounds of the eyeball, it necessary to keep the eye covered for several weeks. Here again t wearing of the bandage is followed by severe conjunctival irritatio In all these cases I propose suturing the lids in almost the enti length of the free border. Freshening is performed with a bisto and not with scissors. Four sutures will suffice, and the occlusi should be maintained from one to several months.

The following is a description of a few cases:

Superficial ulcerative keratitis with irititis.—A man fifty years o had been treated for a month without result, for an ulcerative keratiti by the ordinary treatment with a bandage. He finally develop a hypoyon. Eight days after, suture of the lids, preceded by a sm paracentesis, improvement was very marked, although the sutu had only *partially* held. The patient simply wore dark glasses.

Superficial burn of the cornea with HCl; ulceration limited at fir to the centre of the cornea; total corneal anæsthesia.—A woman, for years old, with these complications, came to me in July, 1895. Trea ment: Irrigations and bandage. After a month the irido-corneal ir tation persisted. Small hypopyon. I sutured the lids of this e and the patient was able to resume her work after a few days. December, 1895, she begged me to uncover her eye. I disunited t internal portion with regret, knowing that the cornea would still anæsthetic. Three weeks afterwards the patient came back with attack of keratitis, and cornea completely clouded, and ciliary pa I was again obliged to suture the internal portion, and all the sy toms disappeared.

Old peripheral neuritis of the internal frontal branch, in a child years old, of slow progress without pain or eruption.—I had treated t child for a long time for ulceration of stroumous keratitis, altho the form of the ulceration in a transverse band in the field of the palpebral opening appeared to me to be curious. One day, on touching the cornea, I found that it was completely anæsthetic. The bandage applied up to that time had greatly irritated the lids, and the ulceration threatened to become deep. Suture of the lids for three months only. Now the cornea, though still anæsthetic, is but slightly cloudy. The operation was performed a year ago.

Penetrating wound, six millimetres in length, made by scissors, in the cornea and the sclera, across the limbus.—A child, five years old, brought for consultation in October, 1895. The direction of the wound led to a suspicion of a lesion of the ciliary body. The borders were somewhat swollen, but were in contact.

I immediately applied sutures, four days after the accident. The sequelæ were very simple. I saw the child again in January, and through the extremities of the palpebral fissures I could see that the eye was in perfect condition. A white cicatrix alone marked the position of the traumatism.

Dr. Parent.—Why not, in the cases mentioned by Dr. Kalt, produce palpebral occlusion by the aid of adhesive bands, as Desmarres does. As for the use of the knife instead of scissors in freshening the palpebral border, this is nothing new, as I have always seen Galezowski employ a knife.

Dr. Despagnet.—I think it is going too far to employ palpebral suture for a corneal ulceration. Irritation of the free border of the lids by the conjunctival secretion may be avoided if the precaution is taken, in applying a piece of gauze, to leave the angles of the palpebral slit uncovered. In freshening, I employ Beer's knife.

Dr. Antonnelli.—The occlusive bandage frequently cures cases of chronic conjunctivitis instead of aggravating them.

Dr. Kalt.—In proposing palpebral suture for cases of ulceration of the cornea, I do not desire to recommend its general use. There are many cases which recover from the simple application of a bandage, and I do not treat these cases differently from my colleagues. But if the ulceration is not cured after three weeks I then perform palpebral suture.

This operation seems to be more especially indicated in cases of corneal anæsthesia or in traumatism.

On the Permeability of the Eyes to the Röentgen Rays.

Dr. Dariex.—Without entering upon a physical study of the Röentgen rays, I wish to consider the question from a point of view which may be of ophthalmological interest. Why are these rays invisible? Is it that they do not affect the photo-chemical substances of the eye, or does their invisibility depend upon other factors? We know that these rays traverse with difficulty transparent substances, as for example, glass and crystal. Possibly their invisibility depends upon the fact that they traverse with difficulty, or not at all, the refractive media of the eye. It was with the purpose of investigating this question that I made several experiments, which I shall describe at the Polytechnic School with Colonel de Rochas.

In the first experiment an eyeball deprived of its muscles was placed on a sensitive plate underneath a source of Röentgen rays. After twenty minutes' exposure the plate was developed.

The eye had formed a screen and the portions covered by its projections had not been affected.

In a second experiment a cornea, a lens, scissors and a fragment of muscle were placed on a sensitive plate. After twenty minutes exposure, the projection of the scissors was very opaque, the lens and the muscle were a little less opaque, the cornea was less opaque than the lens, but more opaque than wood.

A photograph was also taken of an ophthalmoscope disk and in the orifice not provided with a lens, a human lens was placed. The positive showed that the glass lens were slightly traversed by the X rays, but that the lens was less so.

Dr. Dariex then showed photographs demonstrating the relative permeability of the muscles, bones, metals, and the different transparent or opaque portions of the eye.

Between the index and middle finger of an adult hand, separated by a fragment of wood were placed a disk of glass 2 millimetres thick, a cornea, a lens and a posterior and anterior pole of an eyeball. A gold ring was placed on the index finger. In the photograph that Dr. Dariex exhibited it was seen that the glass disk was quite as opaque as the bone of the phalanx and the gold ring, that the anterior pole was less opaque, and that the posterior pole was less opaque than the cornea. The lens was slightly more permeable than the muscle of the hand.

The result of these experiments was to show that the ocular media are but slightly permeable to the Röentgen rays, and that it is possible that this may be one of the factors of their invisibility.

OPHTHALMOLOGICAL SOCIETY OF THE ROYAL KINGDOM

Session of January 30, 1896.

The Visual Effects of Errors of Refraction.

Dr. Geo. Bull (Paris).—I have attempted, by means of a photographic camera, to reproduce the effects of different degrees myopia, hypermetropia and astigmatism. The effect of an error of refraction in the appearance of photographs of optotypes was different in certain points from the image seen by the eye. A careful investigation has led me to the conclusion that this difference is explained in every case of error of refraction by monocular diplopia, attributable to the sectors of the lens. By adding a lens divided into sectors to the objective of the camera, I have been able to obtain photographs of optotypes similar to the visual images of corresponding errors of refraction.

Mr. Nettleship stated that ametropes rarely complained of the existence of monocular diplopia. If this phenomena were as extensive as Dr. Bull considers it, it would be more frequently mentioned by the patient.

Dr. Bull thinks that it exists always even in children, but that most persons do not notice it.

Uveal Cyst of the Iris.

Messrs. Eales (Birmingham) and *Sinclair* (Ipswich).—The left eye of our patient, who was forty-seven years old, was affected with absolute glaucoma, resulting from non-inflammatory chronic glaucoma of several years' duration. Two brown spheres projected in the pupillary area, emerging from behind the iris. They followed all the movements of the eyeball, and on examination with the lens a slight trembling was seen on the surface, similar to that of gelatine. The clinical diagnosis of cystic detatchment of the pigment uveal layer of the iris was clearly confirmed by microscopical examination. As far as we know, this is the first case where a cystic detachment of the uveal layer of the iris was recognized in vivo. There are, however, in literature several observations relating probably to this class of tumors, and in which it is stated that undulatory movements of the walls of the cyst may be a differential sign between this affection and peduncleated sarcomas of the iris.

Atrophy of the Optic Nerve in Three Brothers.

MR. OGILVIE (London).—The three brothers were twenty-four, twenty-two and twenty-seven years of age. In the first, vision had disappeared in the course of a single night, in the second in three months, and in the third in the course of six months. They all smoked, but one of them had given up tobacco seven years before he became blind. They all had a central scotoma. The perception of colors was defective. One of them had concentric contraction of the limits for white. The ophthalmoscopic image was not very characteristic in two of the patients; the disks were pale, but the atrophy was not far developed. Visual acuity was greatly reduced. Vision of one of the patients was somewhat improved under the action of electricity and strichnine. The three brothers, as well as other members of the family, had very tortuous retinal vessels. My three patients were the only members of the family known to be affected with optic atrophy. The father and mother enjoyed good vision, and of the nine brothers and sisters of the mother no one had defective vision. She had had sixteen children, fourteen of whom were born living, but all the male children, with the exception of the three blind brothers, had died in infancy.

MEDICAL AND SURGICAL SOCIETY OF BORDEAUX.

Session of January 24, 1896.

Syphilitic Iritis.

Dr. Armaignac communicated an observation of syphilitic iritis, both plastic and parenchymatous, unilateral and with gumma of the iris. Recovery was brought about by instillations of atropine and pilocarpine, mercurial inunctions, small doses of calomel and Gibert's syrup internally. The patient's vision returned to the normal. Dr. Armaignac thinks that specific iritis may assume the parenchymatous, as well as the plastic form. He states that the diagnosis between tubercular iritis and gomma is frequently difficult. In conclusion, he dwells upon the excellent result obtained with mercurial treatment after the old method.

Dr. Lagrange mentioned in addition to the plastic and parenchymatous varieties of iritis which are classical, the serious variety, also of syphilitic origin. In regard to the differentiation between tuberculosis and gumma of the iris it is not impossible to differentiate them. Gummous iritis is situated on the free border, and tubercular on the adherent border; the gumma is dark and more vascular than the tubercle; the latter is sometimes surrounded by small characteristic miliary tubercles; and finally, in addition to local signs symptoms of the general condition can generally be found which facilitate the diagnosis. As to the treatment of rebellious syphilitic iritis, the best form consists of subconjunctival injections of $\frac{1}{1000}$ sublimate with general mercurial and iodide treatment, especially intramuscular injections of the oil of bi-iodide of mercury.

Dr. Martin also favors subconjunctival injection of sublimate and injections of oil of the bi-iodide.

The differential diagnosis between different forms of iritis seems to him to be very difficult. There may be doubt between a gomma and a plastic exudate due to simple iritis, as in a case which he had observed. Gommous iritis indicates a severe form of syphilis. It was remarkable in Dr. Armaignac's case that the lesson remained unilateral.

Dr. Dubreuilh, observing that ophthalmologists only speak of mercury and never of iodide, concludes that in tertiary syphilis of the eye, as in that of the brain, mercury is more successful than iodide of potassium, an interesting similarity between the central and peripheral nervous apparatus.

Dr. Armaignac does not see the connection of serious iritis, a very rare form, of uncertain etiology and occurring with identical characteristics in persons exempt from syphilis, and syphilis. He emphasizes the difficulty of differentiating between tubercular and gummous iritis Their pecular signs are rarely so complete and clear as to prevent doubt, if not confusion. In conclusion, he objects to subconjunctival injections of sublimate, a modern form of treatment with which he has not obtained extraordinary results, but some failures.

ACADEMY OF SCIENCES.

Session of February 17, 1896.

Applications in Tachymetry and Ophthalmology of a Method of Producing Color as yet Unexplained.

DR. CHARLES HENRY. (Note presented by DR. SARRAU.)

In November, 1894, Dr. Charles Benham published a disk one-half of which was black, and the other white, had four groups of three concentric arcs of circles of 45°, whose radii increased from the periphery to the centre of the disk for an observer seeing them at his left. If a small axis of rotation was placed in the centre of this disk and the top revolved in the direction of the hands of a watch (a direction which I shall call direct, and the opposite inverse) the four groups of concentric are present, for a certain slow speed, the appearance of intense color circles which are, for most people, from the periphery to the centre, red, yellow, green and blue. If the top is revolved in the inverse direction the position of the colors is inverted and the tints are, always from the periphery to the centre, blue, green, yellow and red. These appearances, as yet unexplained, are not seen by all eyes without exception. They remain on monochromatic illumination or when seen through colored glasses. We are then in the presence of peculiar retinal excitations, independent of wave lengths, and of which it is necessary to analyze the mechanism.

If two disks are arranged, half black and half white, according to a symmetrical axis passing through their centres, the white of the one being on the same side of the axis as the black of the other, and reciprocally; if on each of the white semi-disks, group of acres of symmetrical circles are traced, a new top is obtained, which I call B, the other, which I call A, being Benham disk; if B is turned in the same direction as A, the situation of the colors is inverted for B, that is, that B shows blue in the periphery, when A shows red, and reciprocally. *If A turn in the direct sense, and B in the inverse sense, or if A turn in the inverse sense, and B in the direct sense, the situation of the colors is the same in both disks.*

I must here generalize a common experiment. When the eye which is in darkness encounters a luminous object in the visual field it is displaced in the direction of the object in order to make the image coincide with the fovea; in fact, it is always directed from darkness to relative darkness, and from this relative darkness to light. On the other hand, the periphery of the disk corresponds to the maximum amplitude of movement, which an eye with muscles at rest will perform in favor of its fovea. If we apply these laws to the case in question, the eye will follow the concentric arc of the disk I (relative darkness during slow rotation) in a particular direction which shall call the normal direction of ocular movement, and which proceeds across the exterior concentric arcs from the black semi-disk (absolute black) to the white semi-disk. This deduction enables the preceding law to be stated under this more interesting form: when the disks A and B turn in a direction contrary to the normal direction of ocular movement, red is seen at the periphery and blue at the centre; when the directions are similar, blue is seen at the periphery and red at the centre.

But it is known that the eye always tends to follow displacements of a body whose movements are not too rapid; it will tend them to follow the rotation of the disk (it is always in the periphery of the disk where the linear speed is at the maximum that an eye with muscles at rest and tending to action will by preference adjust its fovea). But at the same time in the case where the direction of ocular movements and the direction of rotation of the disk are opposite, the eye is enticed in an opposite direction. If the two forces are equal, it will remain fixed: the image of the most peripheral concentric arc will act on the fovea. On the contrary, in the case where the direction of ocular movement and that of rotation of the disk are in accord, the eye will be displaced; it will describe concentric circles with their radii decreasing to the centre of rotation. If it fixes a point it can only fix the centre of the disk where the displacement is insensible; then in this case it is the most central arc which will excite the fovea and the most peripheral arc which will excite the periphery of the retina.

We know that in general the fovea, relatively blind for blue and slightly sensitive to green, is very sensitive to red. On the contrary, the periphery of the retina, relatively blind for green or red, is only sensitive to blue. *Then in case of contradiction between the direction of ocular movement and the direction of rotation of the disk, when the fovea fixes the periphery of the disk and receives a stimulation, the consecutive impression during the passage of the semi-disk can only be red; also when the periphery of the retina receives the image of the centre of the disk, the consecutive image can only be blue.* In the case where the direction of the ocular movement and the movement of the disk are similar the appearance of the colors is evidently explained in the same way. The medium zones of the retina, more sensitive to yellow and green, will give a yellow or green consecutive image whenever the elements sensitive to yellow or green will have received the greater stimulation. It will be readily understood why slow speed and a black semi-disk are indispensable.

As the best speed for the appearance of colors is constant for each person, and in a very large degree independent of the size of the retinal image and the illumination, I have had an indicator constructed by M. Ph. Pellin based upon the knowledge of this speed, which I place at the base of a multiplying or a reducing cone of unknown speed in a relation easy to be found.

From the physiological point of view, the zinc top, also constructed by M. Ph. Pellin, with a very heavy pivot working on a plate of glass enables one to diagnose motor differences of different eyes and possibly also differences of sensitiveness of the fovea. In order to render the measurement of the speed more easy for physiological study, I mark out in the semi-disk a white sector of 60°, and thus count very readily with a Redie chronometer the number of turns per seconds (averaging about two) necessary for the best chromatic results.

SOCIETY OF MEDICAL SCIENCES OF LYONS.

Session of January, 1896.

Action of Light on the Nuclei of the Rods and Cones.

Dr. L. Dor.—Independently of the migrations of retinal pigment which occur under the influence of light, movements of the cones are known to exist which were described by Engelman and Van Genderen Stort at the Congress of Copenhagen (1884). Under the influence of luminous radiations the cones become shorter and in darkness resume their primary length. These movements, very clearly seen in the frog and some other animals, are doubtful in the mammifera and in man. What can be the significance of movements existing only in certain classes of animals? This question has been frequently asked without being solved.

A fact which I have observed may possibly enable an explanation to be given of the purpose of this phenomenon.

I have noticed that when the retina of a frog, which while the animal was still alive had received various luminous impressions arising from blue lights or monochromatic light, was hardened with formol, differences were observed in the side of the nuclei of the cones; in the shortened cones the nucleus was large while in the cones which had their proper length the nucleus was smaller.

The external segment of the cones in the frog is excessively thin while in man and the mammifera this same segment is much larger. Every slight modification of the nucleus will react on the cones of the frog while these same modifications will be almost without effect on larger cones. Furthermore the rods of the frog are very large and they scarcely contract at all when the nuclei of these rods undergo the same modifications as the nuclei of the cones.

I then conclude that, without denying the contractility of the cones, this contractility is not demonstrated by the fact of their shortening under the influence of light, since another interpretation can be given and because account should be taken of the fact that light modifies the nuclei of the visual cells.

Cysticercus in the Vitreous.

DR. H. DOR presented the case of a girl in whose vitreous, opthalmoscopic examination, was seen a bluish white vessicle exhibiting trembling moevments on movement of the eyeball.

This displacement of the vessicle was sufficient to eliminate the idea of retinal detachment. The bluish or bluish green tint was also quite characteristic. It was a cysticercus of the vitreous. This affection is rare. About 1 case is observed among 20,000 patients affected with diseases of the eyes. This is the second case which Dr. Dor has observed in France where the affection is much less frequent than in Germany. The patient who lives in Auvergne, remembers that some time ago she ate some bad pork and this was probably the origin of the disease.

III. REVIEWS OF OPHTHALMOLOGICAL JOURNALS.

Centralblatt Fur Praktische Augenheilkunde

Reviewed by Dr. V. MORAX.

September.

I.—The Glands of Manz in the Normal Conjunctive of Man, by Dr. T THEODOROFF.

In 1859 Manz discovered some peculiar glands in the conjunctiva of the pig. These glands were situated in the bulbar conjunctiva near the corneal border and formed small goured shaped vessicles with contracted neck and filled with polygonal epithelial cells. Stromyer thinks that he found them the same year in the human conjunctiva. But the investigations of Manz, W. Krause and Kleinschmidt were negative. Waldeyer did not consider them as glands but as collections of epithelial cells.

Theodoroff has seen these glands distinctly in the conjunctiva of the adult and the child. To put them in evidence it is necessary to spread out the bulbar conjunctiva and to stain it with a nuclear color. Eighteen to thirty deeply stained points are then distinctly seen which present rounded orifices on the surface of the conjunctiva. On transverse section an enveloping membrane is recognized, covered with stratified cylindrical epithelium. The glandular cavity is filled with cells and a granular detritus.

II.—Prophylaxis and Ophthalmia of the New-Born, by Dr. J. VIDMARK.

In 1884 the proportion of cases of ophthalmia of the new-born was 2.27 per cent. of the births in Stockholm. In 1885 a committee of the Swedish Medical Society considered the question of prophylaxis of ophthalmia of the new-born, and in a set of instructions distributed to mid-wives recommended to them the Crédé method without making it obligatory. This method was adopted in all the maternity hospitals in Stockholm. The result was a marked decrease in the number of children affected.

In 1884 ophthalmia of the new-born constituted 1.2 per cent. of the total number of ocular affections treated in the polyclinics in Stockholm. In 1890 it only constituted 0.24 per cent. While in 1884 lesions of the cornea were met with in 30 per cent of the cases ; in 1888 they were only found in 6 per cent. of the children affected with ophthalmia of the new-born.

This improvement depends not only on the application of the

Crédé method, but also on the fact that public attention has bee drawn to the dangers of the disease.

III.—**Operative Treatment of Astigmatism**, by Dr. FABER.

A young man, 19 years old, came for consultation with myop astigmatism of 1.50 D, axis 120°, of the right eye and vision 4-1 without correction.

This weak vision had debarred him from military service. Th fact that iridectomy for cataract operation causes astigmatism ha long been known, but an operation has not as yet been attempted fo the purpose of correcting astigmatism. Faber made a corneal incision in this patient, 6 millimetres long, perpendicular to the meridia of highest refraction.

Eighteen days afterwards examination of the refraction showed a astigmatism of 0.75 D, axis 30°, with vision 6-8 without correctio and on a second examination the patient was declared fit for milita service.

October.

I.—**Contribution to the Study of Horns on the Lids**, by Dr. C. ACHENBAC

According to Lebert cutaneous horns were described in t thirteenth century. Since then a certain number of cases have bee described. That published by Achenbach was observed in a woma 58 years old who had on the lower lid of the right eye a slightl curved conical projection, the base of which was of elastic consistency and the summit of horny resistance.

Histological examination showed that it was a horny papilloma.

II.—**Visual Disturbance Resulting from Diffusion**, by Dr. J. HIRSCHBERG.

Hirschberg reproduces two photographic plates obtained, the on with a normal objective, the other with an objective, the upper half o which was covered with a sheet of silk paper; the image thus obtaine was diffuse. Hirschberg concludes that with a corneal leucoma covering half the pupil, recourse should not be had to iridectomy, but th leucoma should be tatooed in order to improve vision at a distance.

III.—**Etiology of Scrofular Ophthalmia**, by Dr. GORDON NORRIE.

The author attributes the most important etiological rôle to th pediculi capitis in a large number of cases of scrofular ophthalmia.

IV.—**A Rare Case of Orbital Syphilis**, by Dr. M. MANDELSTAMM.

A man 55 years old, syphilitic for 20 years, presented bilatera exophthalmus with ophthalmoplegia external and conjunctiva lan palbebral oedema. Antisyphilitic treatment (iodide of potassiu and injections of salicylate of mercury) produced marked improvement.

V.—A Case of Pigment Adenoma of the Conjunctiva, by Dr. Steiner.

Steiner extirpated from a Malay, suffering from trachoma, a small tumor 7 millimetres in diameter, not pediculated, situated on the tarsal conjunctiva and dark in color. The surface was smooth. Histological examination showed that the tumor was formed of glandular acini of variable dimensions. Their walls were covered with several layers of epithelial cells. These cells contained pigment granules, and the pigmentation was more marked in the superficial than in the deep cells. There was no basal membrane.

It is not rare to see pigment spots in Malays, not only on the limbus but on different portions of the conjunctiva. Histological examination shows that in these spots the pigment is situated in the epithelium or in the subepithelial tissue. In the glands, whose secretory canal opens near the pigment spot, it is not rare to see pigment in the glandular epithelium. In this particular case Steiner supposes that a pigmented gland was the origin of the tumor.

November.

I.—History of the Statistics of Blindness in Russia, by Dr. Ischreyt.

II.—Idiopathic Serous Cysts of the Iris, by Dr. Ginsberg.

Ginsberg observed at Hirschberg's clinic a child five years old, who since birth had presented a small spot, the size of a pin-head, on the iris of the left eye. This point increased progressively in size, until in a few weeks it attained the size of a pea. This was a cyst, situated on the nasal side, and reaching to the posterior surface of the cornea. The eye was not irritated. The cyst was excised. Histological examination showed that its wall was covered with a simple layer of endothelium. The anterior wall was thin, and the stroma was composed of distended iris tissues. Ginsberg accepts the interpretation of Schmidt-Rimpler as to the origin of these serious cysts, that they are retention cysts, caused by dilation of a lymphatic.

III.—An Interesting Case of Extraction with a Magnet, by Dr. Gelpke.

A locksmith, twenty years old, received, April 8, 1893, a blow from a fragment of steel, which perforated the cornea and entered the vitreous, after injuring the lens. The treatment consisted of rest and instillation of atropine for nine months. The eye continued to be somewhat painful. December 3, 1893, slight pericorneal infection was noticed. Ocular tension was somewhat diminished, and vision was *nil.* The iris was of a rusty color, and the lens presented a slight uniform cloudiness. After dilation of the pupil, the fundus of the eye could be distinguished, and a very distinct mass was seen in the neighborhood of the ciliary body. The vitreous was cloudy and contained flocculi. The disk was somewhat redder than in the normal condition. In the right eye vision was somewhat diminished, and the disk was of brilliant red, with diffuse outlines. The vessels were dilated and tortuous. The pupillary reactions were less active than in the normal state.

On the same day, Gelpke made an incision in the sclera, at a point corresponding to the position of the foreign body, and extracted it with an electromagnet. The sequellæ was simple. Three weeks afterward the sympathetic phenomena in the right eye had completely disappeared, and vision was again normal. The symptoms of irritation in the left eye had also receded, but vision remained defective. March 4, 1894, an iridectomy was performed on this eye, with discission of the cataractous lens, and in April, 1895, vision was O.3 with + 9 D.

One should never hesitate to attempt extraction of a foreign body with the electromagnet, even if the metallic fragment has been fixed in the eye for a long time.

December.

I.—Contribution to the Operation of Entropion, by Dr. AUGSTEIN.

Excision of the conjunctiva is always necessary in the operation for entropion, but it is only sufficient by itself in a small number of cases. Combined with elevation and shortening of the lid, it gives good results even in severe cases. To obtain elevation of the lid, preference should be given to the V-shaped incision.

II.—Chronological Evolution of Syphilitic Affections of the Optic Nerve from 150 Cases, by Dr. JANUSZHIEWICZ.

Syphilitic ulcerations of the optic nerve may be degenerative or inflammatory. The first includes cases of simple atrophy and cases of tabetic atrophy. The second includes cases of acute neuritis, or neuritic atrophy.

Of 150 cases collected at Hirschberg's clinic, 107, that is to say 71.3 per cent., were cases of degenerative alterations, and 43, that is 28.7 per cent. were cases of inflammatory alterations.

The 107 cases of the first group were divided into 45 cases of simple atrophy, and 62 cases of tabetic atrophy.

Simple atrophy started in 1 case 6 months after the primary infection, and in 2 cases 29 years after the chancre. Most frequently the visual disturbance develops in from 5 to 10 years after the infection.

Amaurosis commenced in 10 cases during the observation, and the development lasted from 6 months to 5 years at the maximum.

As to sex, 28.8 per cent. were women, and 71.2 per cent., men.

Tabetic atrophy developed in 1 case 2 years after infection, and in another case 30 years after, but it most frequently appeared in from 5 to 20 years after the primary accident. Here again the male sex forms the largest contingent: 83.9 per cent. men, and 16.1 per cent. women. The development up to amaurosis lasts from 1 to 8 years.

Acute syphilitic optic neuritis was observed in 26 cases. It develops most frequently in from 1 to 5 years after the infection. In 1 case it appeared 2½ months after the chancre. In 11 cases mercurial treatment brought about a manifest improvement, especially in cases where the affection was relatively severe. In 4 cases atrophy followed neuritis.

Neuritic atrophy was found in 17 cases, and, when found, the time which had elapsed since infection, was in general quite long. In none of these cases was there improvement.

To draw a general conclusion, it may be said that syphilitic optic neuritis is observed principally in from 1 to 5 years, and atrophy in 5 to 10 years after the specific infection.

III.—**Neuritic Atrophy of the Optic Nerve in a Mother and Child,** by Dr. MAX LINDE.

A child 3½ years old with atrophic disks and very marked weakness of vision. The mother 26 years old with atrophic pallor of both disks, central scotoma and corresponding weakness of vision. Hirschberg thinks that these lesions are of syphilitic nature, but nothing in the previous history or in the examination of the patients confirm this statement.

La Klinique Ophthalmologique.

Reviewed by Dr. BOURGON.

June.

I.—**Commencing Granular Conjunctivitis,** by Dr. MANOLESCU.

(To follow.)

II. **Ocular Complications of Diabetis,** by Dr. KOENIG.

(See ANNALES D'OCULISTIQUE, Vol. CXIII, p. 364.)

III.—**On the Beneficial Action of Superficial Cauterization of the Entire Corneal Field in Cases of Infiltration and Complete Softening of the Cornea Resulting from Purulent Ophthalmia,** by Dr. SUREAU.

(See ANNALES D'OCULISTIQUE, Vol. CXIII, p. 363.)

July.

I.—**Commencing Granular Conjunctivitis,** by Dr. MANOLESCU.

Four principal forms should be distinguished: 1st, the forms with granulations, 2d, the forms without granulations (catarrhal), 3d, acute imflammatory form, and 4th, purulent form.

In all four forms the affection is contagious and hence the necessit of rigorous prophylactic measures: Disinfection of articles employe for the toilet, ventilation of the apartment, and washing the eye morning and night with an antiseptic solution.

II.—Membranous Conjunctivitis, by Dr. Jocqs.

The division of conjunctivitis into diphtheritic and pseudo mem branous should no longer be retained so as to bring in accord clinic observation and bacteriology. They should all be designated a membranous, and this denomination followed by the name of the m crobe dominating in each case, which will give an indication of th prognosis.

III.—A Case of Pseudo-Membranous Conjunctivitis with Pure Strept cocci; Failure of Anti-Diphtheric Serum, by Dr. Darier.

(See Annales d'Oculistique, CXII, p. 427.)

August.

I.—The Question of Extraction of the Normal Lens, by Dr. Lagleyze.

In three cases operated upon the result was good. The modu operandii was: discission, simple linear extraction of the lens afte imbitation by the aqueous humor.

II.—On the Method of Cauterizing in the Treatment of Purulent Ophthalmia: Suppression of the Forceps: Tampon Stylets, by Dr. Gaupillat

III.—The Good Effect of the Galvano Cautery in the Corneal Complications of Purulent Ophthalmia, by Dr. Abadie.

IV.—Another Case of Venous Dilitation of the Orbit, by Dr. Jocqs.

The author compares a case of intermittent non-pulsating exophthalmus described by Richter (*Arch. für Augenh.*, XXXI, No. 1) t those of which he spoke before the French Ophthalmological Society

September.

I.—A Case of Cholesterine in the Anterior Chamber, by Dr. Romiée.

This rare affection has only been seen twice by Dr. de Wecker.

The present case was a woman 53 years old, who in 1886, had severe change in the right eye with suppression of vision. The trouble ceased and reappeared in a transitory way in 1890.

In December, 1894, right hemicrania appeared. The diagnosis was O. D. old. detachment of the retina, total posterior synechia with cataract and deposit of cholesterine in the anterior chamber. O. S. areolar choroiditis with posterior staphyloma.

In spite of rigorous treatment, it was necessary to enucleate the right eye. Autopsy of the eyeball confirmed the diagnosis.

II.—Multiple Congenital. Anomalies of the Ocular Apparatus, by Dr Fouchard.

The patient was a girl 24 years old. In the right eye there was microphthalmus, coloboma of the iris, cataract, lateral nystagmus and convergent strabismus. There was irregular astigmatism. The left eye was also affected with microphthalmus, coloboma of the iris, lateral nystagmus and irregular astigmatism. The choroid was divided below and within by a large coloboma.

III.—History of a Foreign Body in the Eye, by Drs. Jocqs and Fourgs.

This foreign body (a piece of a cartridge) remained in the eye forty years without causing any trouble except deformity of the pupil. After occasioning several attacks of iritis, which had left traces, vision was gradually abolished. Finally another more serious attack occurred complicated with hypopyon and the entire foreign body was evacuated after surgical interference.

IV.—Syphilide of the Lid, by Drs. Dubarry and Bernardberg.

This was cured by treatment with iodide of alone and was followed by cerebral complications which resisted treatment with iodide and mercurial inunctions, but which disappeared with hypodermic injections of cyanide of mercury.

October.

I.—Treatment of Infectious Ulcers of the Cornea, by Dr. de Speville.

The author reports four cases of infectious ulcers of the cornea cured by the simultaneous use of subconjunctival injections of sublimate, applications of tincture of iodine and occlusive dressing. It would seem that the use of tincture of iodine locally has hastened the process of recovery.

II.—Partial Poisoning by Instillation of Cocaine, by Dr. Jocqs.

From published observations it is seen that partial poisoning is frequent as the result of instillations of cocaine and frequently disturbances which are attributed to emotional post-operative syncope should be attributed to the cocaine swallowed by the patient.

To obviate these accidents it is sufficient during instillation to invert the lower lachrymal point outwards, so as to avoid the descent of the colyrium into the pharynx.

November.

The Operation for Fistula of the Lachrymal Sac, by Dr. Jocqs.

In order to destroy completely and at a single time the lachrymal fistula, it is necessary to divide the lachrymal sac in its entire length on a grooved sound introduced into the fistula, to be sure that the fistula itself is divided, to tampon the wound until the next day, in order to have a bloodless surface which will enable one to readily distinguish the fistulous tract, to cauterize not only the fistulous sac but also the entire surface of the wound, to carry the cauterization to the deep orifice of the fistula, to again tampon the wound and leave it to cicatrize.

December.

Syphilitic Condylomata of the Iris, by Dr. DE SPEVILLE. (*See* ANNALES D'OCULISTIQUE, Vol. CXV, p. 53)

IV.—BOOK NOTICES.

BOOKS AND THESES.

Introduction Scientifique a la Bacteriologie, by Dr. HUEPPE. (*Kriedel Wiesbaden*, 268 p., 28 fig.)

In sending us a bacteriological treatise to be reviewed, in ANNALES D'OCULISTIQUE, our astonishment led us to ask for a moment whether the editor had not mistaken the address. A short reflection, however, led to the conclusion that the intention of the giver was better justified than our hesitation. We will not go so far as to say, parodying a celebrated phrase of Charcot : *tant vaut le bacteriologiste, tant vaudra l'oculiste.* Opthalmology requires too varied ideas for its experts to risk everything on a single card.

Nevertheless, investigation of the etiology of the majority of inflammatory affections and consequently of their rational therapeutics rests on bacteriological investigations commenced but a short time ago and which have confirmed or created anew a large portion of ocular pathology. The same is true of the exact limitation of many morbid entities. What was the astonishment of the medical world when bacteriological examinations showed a short time ago that the clinical facts best established in the mind not of our authors, at least contemporary ones, diphtheria was of dissimilar microbial origin. Starting from ophthalmology this discovery has thrown unexpected light on one of the most interesting and important portions of internal medicine. Will this be the only surprise that the systematic performance of bacteriological examinations reserve for us ? I do not think so, and from this point of view, I do not consider the sending of a bacteriological treatise to an ophthalmological journal as an error, but as a mark of genius on the part of its editor. Here our lack of confidence arrests us. The review of Dr. Hueppe's very complete and well written book belongs to better informed pens.—S.

The Complications of Eczema in Childhood, by Dr. Hans Oscar Wyss. (*Zurich Thesis,* 1895, 78 pp.)

This very interesting thesis is devoted to the study of the relation of infantile eczema to other diseases. A few facts are given relative to ocular complications.

Of 241 cases treated in 21 years at the Children's Hospital in Zurich, of which 58 per cent. were general eczema with 16 per cent. of deaths, eczematous conjunctivis or keratitis (phlyctenular of authors) was seen in 75 cases, generally in both eyes and very frequently with plepharitis. This is 30 per cent. of all the cases. Eighteen children had diphtheritic complications with 9 deaths. Of this number there was conjunctival diphtheria in 9 cases, with 5 deaths. The combined forms of ocular cutaneous and pharyngeal diphtheria are the most fatal. Two of the cases which recovered retained lesions of the cornea. A child six months old who died of ocular diphtheria complicated with parenchymatous nephritis and bronchitis had both cornea destroyed.—G. H.

Ophthalmia of the New Born and Prophylaxis in Switzerland, by Dr. A. Hein. (*Bern. Thesis,* 1895.)

After giving a very complete bibliographic review of information in regard to opthalmia of the new-born, the author discusses the different methods recommended for prophylaxis of this affection and gives the statistics of obstetricians and oculists. He concludes that it is necessary to disinfect the vagina before each labor with an inoffensive antiseptic solution. As to prophylaxis applied to the eye itself, irrigation with running water or with astringent solutions or simple disinfectants have given quite as good results as the Crédé method. The author recommends careful irrigation immediately after birth with an indifferent fluid.

In the last chapter, Hein states the different sanitary measures in regard to prophylaxis of ophthalmia of the new-born in the different cantons of Switzerland.—V. M.

MEDICAL JOURNALS.

A Case of Double Diphteritic Conjunctivitis with Double Corneal Affection, Treated with Antitoxin, by D.s. Hamilton and Emrys-Jones. (*Brit. Med. Journ.,* 1895, p. 1419.)

February 28th a child one year old had a slight attack of scarlatina. The temperature was 103°, and the eruption was well-marked, but there was nothing in the pharynx. The eruption disappeared, the temperature fell, and on March 4th, desquamation commenced. March 16th, the right lower lid became swollen and the skin red and shiny. The free borders of the lid were red and there was photophobia. On the next day I found the conjunctiva very vascular and scattered over with red spots. The same alterations appeared on the left eye.

I prescribed an astringent sedative lotion. On the next day, the lids could only be inverted with difficulty. The conjunctiva was yellow, smooth and infiltrated with a thick fibrinous exudate. Lotions of sublimate 1-5000 every hour. On the next day both cornea were infiltrated and in the right cornea was a marginal ulcer occupying one-sixth of its circumference. The fundus of this ulceration was covered with a yellow opaque substance. Dr. Emrys-Jones, who was called to see the case with me, made a diagnosis of diphtheritic conjunctivitis. He advised the use of a solution of nitrate of silver, 20 grains to the ounce, every three hours, and irrigation with a solution of boro-glycerine. March 21st, the throat was affected and there was a large diphtheritic patch on the tonsils. That evening on the advice of Dr. Emrys-Jones I injected 10 c.c. of antitoxin. On the next morning the temperature had fallen from 102° to 92.2°, the swelling of the lids had diminished and the false membranes were partly detached from the lids. A second injection caused them to disappear completely from the lids and the pharynx. The use of nitrate of silver and boro-glycerine was continued. March 26th, another false membrane in the pharynx necessitated another injection. Since then there has been no further relapse and the cornea have begun to clear. The patient cannot open the eyes, the conjunctiva is markedly injected, the cornea are cloudy, and there is purulent secretion. The application of nitrate of silver and boro-glycerine was continued, and in addition instillations of atropine every two hours replaced during the night and morning by eserine. A portion of the cornea was torn off and carried away by the irrigation. Unfortunately the infiltration of the right cornea was so deep as to cause perforation. The left eye is completely cleared up with the exception of a small cloud on the lower border which is rapidly disappearing. Vision is perfect and the child can pick up pins on the floor and sees at the normal distance. The right cornea is also clearing up and it is to be hoped that in time full vision will be restored in this eye.

This case is reported on account of the extreme rarity of preservation of vision in these terrible but fortunately rare cases.

Sphero-Toric Glasses in Aphakia, by Mr. Prentice. (*The Ophthalmic Record,* January, 1895.)

The surface of toric lenses may be likened to that of a cornea with regular astigmatism: two curves of unequal radii with principal meridians perpendicular.

Consider a lens with such a surface on one side and a spherical surface on the other and one has a sphero-toric lens.

The author's aim is to demonstrate that sphero-toric lenses are superior to sphero-cylindrical lenses in the correction of astigmatism after cataract extraction.

Suppose a case corrected by a convex spherical lens of 9 dioptres placed in the trial frames behind a convex cylinder 3.50 D, axis at 160°, one prescribes:

-- 9 D Spher. = + 3.5 D Cyl., 160°

The optician who reads the prescription literally grinds a lens with a surface 9 D sph. on one side, and 3.5 D. cyl. on the other, thus substituting a plain convex element for a bi-convex element, which was employed by the examiner. Furthermore, in mounting the lens, he places the spherical curvature in front, thus modifying the conditions under which the examination was made.

This change alters the position of the nodal point of the entire system and is not without influence on the result obtained.

On the other hand, a very prominent convex surface gives rise to reflection of rays in the interior of the lens and the patient experiences the sensation of seeing as though through a luminous medium.

All these inconveniences are avoided by means of toric lenses.

The following is the method for transforming a sphero-cylindrical combination into a sphero-toric combination with minimum prominence of the anterior surface.

Take the example given above:

In such a combination the total dioptric value of the greatest meridian is 9 3.50 = 12.50 D. That of the opposite meridian is 9 D. Take as the spherical value of the sphero-toric combination about half 12.50, say 6 D. The value of the torus will be in one of its meridians 3 D, and in the opposite meridian 6.50, and it is written: + 6 D, Spher.-toric surface: + 6.50 D, 160° + with 3.00 D.—Van den B.

642 Cases of Convergent Strabismus, by Dr. CHARLES STEDMAN BULL. (*New York Med. Jour.* Aug. 24, 1895.)

Conclusions:

In alternating strabismus both eyes generally have the same amount of ametropia, or almost the same, with good visual acuity.

Tenotomy of the internal rectus of the eye which squints the most, and correction of the anomaly of refraction commonly produce a good and lasting effect.

If the strabismus is monocular, the defect of refraction is different in both eyes. The eye which squints has the highest degree of anomaly and is amblyopic.

If the external rectus of the squinting eye has it normal strength, advancement combined with section of the internal rectus of the same eye gives the best results.

If under the same conditions the external rectus of the squinting eye is very weak, one should commence with the same operation on that eye, and then later tenotomize the internal rectus of its mate. It would be imprudent to perform tenotomy of both internal recti at one sitting.

If emmetropia is accompanied with strabismus, the author has found that tenotomy of both internal recti performed at long intervals, is the best method of procedure.

There are cases where one does not know what to do and where the result is doubtful.

Cases in which amblyopia is due to material alterations, such as corneal opacities, chorodial atrophy, etc., ordinarily demand very extensive operative intervention.—Van den B.

V. MISCELLANY.

CORRESPONDENCE.

(Open Letter to ANNALES D'OCULISTIQUE.)

External Iritomy, by Dr. KALT, Physician at the Quinze-Vingts.

My excellent friend and colleague, Dr. Lagrange, described in the November number of ANNALES for 1895, a new operative method enabling one to avoid extensive breaches in the iris, when it would be sufficient to have a narrow stenopeic slit to give free passage to the luminous rays. We know how many patients with corneal opacities are frequently disturbed by the glare resulting from ordinary iridectomy, especially when the opening, and this is not very rare, is made in a meridian near the horizontal. Another frequent inconvenience of these gaps, always too large, is to allow rays to penetrate the eye, which have traversed more or less cicatricial portions of the cornea, and hence irregular astigmatism and indistinct image.

The indication for transforming the pupil into a slit with the direction of a transparent radius of the cornea, was certainly best realized by Critchett's iridesis, and it is certainly a shame that too frequent glaucomatous complication have caused this operation to fall into discredit.

Section of the sphincter in place in front of the lens, as proposed by Dr. de Wecker, is evidently a very risky operation. There remains section of the iris previously drawn outside. The idea of this section has certainly come into the mind of more than one operator at the time when in performing an iridectomy he prepared to cut the flap with his scissors. Thus in 1891, I performed the operation recommended by Dr. Lagrange on quite a number of patients with central corneal opacities. My operative manuel was the same as that which he recommends, but I did not instil eserine until after the operation instead of before. This detail, however, does not seem to me to be of great importance. I must say that I obtained some very fine results. The new pupil was of a triangular form with peripheral summit, and the borders only moderately separated. The patients on their side were satisfied and did not complain of glaring.

But soon I had several semi failures. The iris had returned properly, but separation of the borders of the slit did not occur in a satisfactory manner, although the sphincter had been cut. I attributed this to the slight iritis which frequently appears after an operation on eyes which have gone through a phase of corneal infection.

I then treated in the city a young girl with extensive leucomas resulting from parenchymatous keratitis. The keratitis was more than 2 years old. The opacities seemed to be stationary and an operation was decided upon, and I did not hesitate to perform iritomy with which I had been well satisfied at the hospital. The eye was not irritated and the tension was normal. I had difficulty in reducing the iris, as the patient was quite unmanageable, and very restless. This reduction was nevertheless carefully done as I greatly feared incarceration and glaucoma.—ESERINE.

During the following days, I found that the iris had not completely resumed its place, and there was a prolapse into the lips of the corneal wound. The eye was irritable for 15 days, and then the tension increased so that in about 3 weeks a true glaucoma with painful attacks had declared itself. Sclerotomy only produced a temporary result. The patient refused iridectomy, and I lost sight of her.

This, I repeat, occurred in 1891, and since that time I have not dared to perform iritomy, and have returned to iridectomy, which I endeavor, if possible, to perform in the oblique meridians of the cornea.

Glaucoma is evidently the greater danger of iritomy, and Dr. Lagrange does not ignore this, since he describes a case in which prolapse occurred in one of his patients operated upon (see his case III). Fortunately the dreaded complication did not occur, and Dr. Lagrange reassured himself by saying that it should be very rare. I agree with him if I can state an opinion from the dozen iritomies which I have performed, but it should be remembered that in the four operations performed on adults, Dr. Lagrange had one prolapse. This should give rise to reflection, and, for my part, I will await further observations before returning to external iritomy.—DR. KALT.

ANNALES D'OCULISTIQUE

Volume CXV.—Number 4.
APRIL, 1896.

I.—ORIGINAL ARTICLES

MEMOIRS

NASAL AFFECTIONS AND REFLEX OCULAR DISTURBANCES.

By Dr. **GEORGES LAURENS,**
Intern of the Paris Hospitals.

Hack[1] (Fribourg en Brisgau) was the first to observe reflexes originating in the nasal mucous membrane. He called attention to the fact that certain nervous phenomena: coughing, neuralgia, headache, were related to a pathological tumefaction of the pituitary membrane, and that by treating this a cure was obtained of many neuroses which had previously resisted various forms of treatment.

The class of nasal neuroses has since then been considerably enlarged, and many reflex disturbances, headaches, pain in the vertex, occipital pain, vertigo, nightmare, epilepsy, asthma, spasmodic cough, etc., have found their explanation in a condition of inflammation and chronic irritation of the nose. Nothing is more logical than that the eye, by its immediate neighborhood to the nasal fossæ and sinuses, and by its direct connections with these cavities (vascular, nervous and the lachrymo-nasal canal), should feel the action of these reflexes. There are, however, limits to this pathological association, and it is evident that we can not include under the designation of ocular disturbances of nasal origin certain passing occurrences, such as lachrymation and blepharospasm, caused by the introduction of a speculum or exploration with a probe, which are physiological facts, transitory in nature, due to simple irritation, and not neuroses, in the proper sense of the word. For this it is necessary that there be a lesion of the nose or of its adnexæ, however slight it may be.

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[1] Hack. (*Wiener med. Wochenschrift*, September, 1885.)

These reflex phenomena, pointed out by Hack, were later confirmed by Gruening,[1] Lennox-Browne,[2] and Bettman.[3] The latter author reported numerous cases of recovery from ocular affections by removal of mucous polypi, by treatment of nasal ulcerations and by cauterization of hypertrophied cornea. E. Berger[4] was the first to observe a contraction of the visual field as the result of a nasal malady. Schmidt-Rimpler[5] and Ziem added further facts, and Lieven[6] described these ocular neuroses in a special memoir. A. B. Kibbe[7] and Grossmann[8] adopted these theories, and the latter author compiled all the known cases.

In France, Trousseau, in a communication to the Ophthalmological Society (April 2, 1889), published some very interesting cases of ocular disturbances, originating in the nasal fossæ, and which could only be explained by a reflex arising from these cavities. One was the case of a girl who only recovered from obstinate blepharospasm, which had resisted all previous treatment, after removal of some small polypi in the nose. Another patient was seized with blepharospasm whenever she had an acute attack of coryza. A man, thirty-five years old, had repeated attacks of ophthalmic migraine, which did not disappear until, on Trousseau's advice, two small pediculated polypi were extracted from the nose. A unilateral mydriasis, inexplicable in appearance, only ceased as the result of cauterization of ulcerations of the nose. Trousseau also describes several cases of veritable asthemopia, rebellious to all treatment except that directed

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1. Gruening. (*Medical Record*, January 30, 1886.)
2. Lennex-Browne. (*Brit. Med. Journ.*, May 28, 1887.)
3. Bettman. (*Chicago Med Soc.*, January 17, 1887.)
4. E. Berger. (*Archiv. für Augenheilkunde*, XVII, p. 293, 1887.)
5. Schmidt-Rimpler. (*Klinische Monatsblätter für Augenheilkunde*, October, 1887.)
6. Lieven. (*Deutsche Med. Wochenschrift*, No. 48, p. 1085, December, 1892)
7. A. B. Kibbe. (*Medical Record*, April 23, 1892.)
8. Grossmann. (*Allg. Wiener Med. Zeitung*, Nos. 14, 15, 16, 8 and 29, 1893.)

towards the pituitary membrane. During the past few years these cases have become better known, have been more carefully studied, and now there is not an ophthalmologist or rhimologist who has not observed them.

Such reflexes are met with in a large number of affections: acute coryza, polypi, ozoena, ulcers of the nasal fossæ, and sinusitis, but they reach their maximum frequency in chronic hypertrophic rhinitis. No precise laws of classification can be given, as they involve nearly all the constituent parts of the ocular apparatus, which they may attack singly or simultaneously. However, on grouping them somewhat schematically, it will be seen that they affect: 1st, the sensibility; 2d, the secretions; 3d, the motility, and 4th, the nutrition and the vasomotors.

I.—Reflex nervous phenomena may affect the general or special sense of the eye.

Disturbances of the general sense are manifested in the form of pain, the nature of which may be quite varied. The patient sometimes complains of pricking sensations, a sort of itching or a burning sensation in the lids and the eyes, or sometimes of supra or infra-orbital pain, with frontal headache. Pain in the internal angle of the eye and ciliary neuralgia are dependent, according to Ziem, on circulatory disturbances. There are cases in which the patients complain of a veritable sensation of a foreign body or dust, although a careful examination reveals nothing abnormal, or only slight conjunctival injection and swelling of the lid. Bettman[1] has, however, observed a swelling of the lids, assuming the form of pseudo-erysipelas, and he attributes it to a circulatory disturbance of nasal origin. Berger, on the contrary, explains it from the blepharitis, following lachrymation, and the blepharospasm accompanying these reflex disturbances. W. Cheatam[2] has described extreme intra and periocular pain, resulting from the application of chromic acid to the nasal mucous membrane. This author goes even farther, and states that all patients should complain of ocular pain whenever nasal cauterizations with chromic acid are performed, an opinion which seems to be somewhat exaggerated. The same writer reports numerous cases of nasal polypi, of obstruction from hypertrophy of the inferior turbinated and deviation of the septum, accompanied by severe pain in the eyes, with diminution of vision, symptoms which disappear on recovery from the nasal lesion.

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[1] Bettman. (*Loc. cit.*)

[2] W. Cheatam. (*Loc. cit.*)

Disturbances of the special sense of the optic nerve and of the retina, exaggeration, diminution or abolition of sight, are revealed by photophobia, amblyopia, and amaurosis.

Photophobia is a very frequent reflex manifestation in many affections of the nose.

Amblyopia is observed less frequently, and is only described in a few cases. Bronner[1] has described disturbances of vision, and amblyopia appearing in the course of inflammatory affections of the nasal fossæ and sinuses, favored by the nervous and vascular connection, he says, between these two regions. This reflex amblyopia has also been mentioned by E. Berger and Mooren. Rosenberg[2] reports a remarkable case of a patient who had peculiar ocular disturbances following cauterization of the nose for a vaso-motor coryza ; objects at first appeared dark-blue, and then there was absolute blindness, which disappeared in seven minutes.

Amaurosis has not been mentioned as a reflex symptom of nasal affections. Schmidt-Rimpler[3], it is true, has seen a case of a woman, twenty-three years old, who had polypi removed from the nose by crushing, and who became blind in both eyes, but he explains this bilateral amaurosis by the consecutive hemorrhage, and suspects anæmia in the visual centre.

II.—Irritation of the nasal branches of the trigeminus frequently reacts on the secretory ocular nerves. *Lachrymation* is its symptomatic translation.

It is known that a reflex flow of tears is observed under numerous physiological conditions. It frequently accompanies sneezing, and also comes after pulling out a cilium from the nasal vestibule. Is there a specialist who has not seen the introduction of a speculum into a nostril or nasal exploration with a probe caused hypersecretion of tears on the corresponding side? All these cases explain the facility with which reflex lachrymation is produced in certain nasal affections, and its great frequency independent of any affection of the lachrymal canals. It is principally observed in cases of hyperplastic rhinitis, with mucous polypi in the nose, in atrophic rhinitis, etc. In all these cases the nasal origin is put beyond a doubt by the result of the treatment. Simple cauterization of the inferior turbinated is sufficient to cure a case of incorrigible lachrymation which has resisted all ocular treatment.

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[1] Bronner. (*Loc. cit*)

[2] Rosenberg. (*Berlin klin. Wochenschrift*, No. 2, January 13, 1890.)

[3] Schmidt-Rimpler. (*Loc. cit.*)

III.—Reflex disturbances of motility of the eyes in the course of affections of the nose or the sinuses may involve the striated muscular fibres or the smooth muscles.

In the domain of the striated muscular fibres disturbances occur particularly in the field of the facial nerve or the common oculomotor, and are characterized clinically by blepharospasm or strabismus.

Blepharospasm is a frequent symptom and causes continual disturbance. If experimentally certain portions of the mucous membrane of the nose are tickled with a feather, spasmodic occlusion of the palpebral opening on the same side is produced, (Berger). This physiological phenomenon is reproduced pathologically in certain alterations of the pituitary membrane. The mechanism can be readily understood. Irritation of the nasal mucous membrane leads to a veritable reflex, the centripetal course of which is through the terminal filaments of the trigeminus to the centre in the course of the fourth ventricle, and the centrifugal course through the facial nerve.

This blepharospasm, the consequence of which is contraction of the palpebral opening, is observed on the side corresponding to the diseased nasal fossæ and is connected with the development of the rhinitis with which it appears, increases, diminishes and disappears.

Strabismus has not been frequently mentioned. Goureau[1] reports a case resulting from adenoid vegetations. This was a child nine and a half years old with external strabismus of the left eye in whom the ocular deviation developed simultaneously with deafness caused by adenoid vegetations. The removal of the latter was followed by the re-establishment of hearing and progressive disappearance of the strabismus of which, four months after the operation, there was no further trace.

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[1] Goureau. (Reviewed in *Receuil d'ophtalmologie*, 1891.)

I have had occasion to observe a similar case in the service of my preceptor, Dr. Tapret, at the Saint d'Antoine Hospital, which case has been published.[1]

I have seen two children with strabismus and abundant adenoid vegetations which were removed, but was not able to follow the histories of these cases, and hence cannot establish a relation of cause and effect between the two affections. It is probable that certain of these ocular deviations should be recognized as originating from disturbances in the nasal respiration, so frequent in children, and that an examination and suitable treatment of the nose may possibly cause recovery from these lesions without any ocular intervention.

When the reflex neurosis affects the smooth muscular fibres it is translated by disturbances of accommodation, spasms, mydriasis, asthenopia, etc.

Mydriasis is rare. It has been mentioned in the writings of Goris (Brussels)[2] and Trousseau. These writers have described pupillary dilatation in patients having nasal lesions and have seen it disappear on treatment of the latter.

Asthenopia is more frequent. There is a veritable accommodative asthenopia of nasal origin. The patients complain of disturbed vision and some cannot read without experiencing fatigue. The letters are blurred and confused and there is at the same time a sense of dragging and pain in the eyes. Ziem, Lieven,[3] Moore,[4] Bronner, Spalding[5] and Trousseau have reported some interesting cases of this form of asthenopia.

Ziem[6] has frequently seen it in cases of chronic obliteration of the nose. Bronner[7] has observed this form of asthenopia coexisting with adenoid vegetation and disappearing on their removal. Horace B. Ware (of Scranton)[8] mentions it as very frequent when there is nasal stenosis. He has made an opthalmoscopic examination on patients suffering with rhinitis and has found a severe inflammation of the retina and sometimes very intense congestion. There was always photophobia in a greater or lesser degree. When the nasal affection was treated and cured, all the ocular symptoms disappeared. A. B. Kibbe[1] has described a very remarkable case of asthenopia and headache due to hypertrophy of the middle turbinated. He was consulted by a patient who had suffered for five years with severe headache and for a year had been unable to read without experiencing fatigue. There was an insufficiency of the external recti of 3°. Rhinoscopic examination revealed a deviation of the septum to the right and an enormous hypertrophied middle turbinated bone on the left side completely filling the concavity of the deviated septum. The hypertrophied turbinated was removed with a Jarvis snare. On the next day the patient could read without difficulty, and eight days afterward, the headache had completely disappeared and the patient could read indefinitely without inconvenience. Tenotomy of the internal recti had been decided upon, but curiously sometime after the nasal operation, the insufficiency of the external recti no longer existed. Quite recently, Mathias L. Foster[2] reported a case of asthenopia due to pressure of hypertrophied turbinated bones on the mucous membrane of the septem. Removal and cauterization of the hypertrophied portions caused the ocular disturbances to rapidly disappear.

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[1] Laurens. (*Presse medicale*, February, 1896.)

[2] Goris. (International Congress of Otology and Laryngology, Paris, Sept., 1889.)

[3] Lieven. (*Loc. cit.*)

[4] Moore. (*Loc. cit*)

[5] Spalding. (*Arch. of Otol.*, Vol. XXI, No. 3, p. 286, July, 1892.)

[6] Ziem. (*Loc. cit.*)

[7] Bronner. (*The Journal of Laryng.*, p. 495, Dec., 1889.)

[8] Hora e B Ware. (*Journal of Opthalm. and Laryng.*, p. 158, April, 1892.)

My preceptor, Lermoyez, has observed a remarkable case which he described to me, and of which the following is a resumé : A man forty years old had been affected with complete anosmia and a nasal obstruction for a dozen years, resulting from swelling of the erectile tissue so marked that in the evening the patient was obliged to cocainize the nose in order to sleep. He also had a very abundant hydrorrhoea and a cough of nasal origin. With the progress of these symptoms there was established an accommodative asthenopia, such that the patient could no longer read at near points without wearing glasses. But when he cocainized the nose, this symptom disappeared and vision became normal.

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[1] **A. B. Kibbe.** (*Medical Record,* April 23, 1892.)

[2] **Mathias L. Foster.** (*Manhattan Eye and Ear Hospital Reports,* Jan., 1894.)

The asthenopia reappeared as soon as the action of the cocaine was spent and the nose again became obstructed.

Cases of asthenopia of nasal origin are increasing, and are of almost daily observation. One should think of this whenever examination of the eye and its adnexæ reveals the fact that refraction, the conjunctiva and the lachrymal canals are normal. We have already seen how it is manifested in a general way, and I can do no better than to quote here a remarkable description given by Trousseau[1]: "A person who was a neurasthenic in general (I grant the predisposition) complained of muscæ volitantes, of slight periorbital pain and photophobia, but he could stand these inconveniences were it not for the fact that it was impossible for him to occupy himself with anything for a long time. Scarcely would he commence to read when the eyes would become red, fill with tears, the pain increase, vision become disturbed and it was necessary to put aside the book in haste. In the evening all this was exaggerated. Yet the refraction was normal and the conjunctiva and lachrymal canals were healthy, the origin of the disease being hidden in the nasal fossæ."

IV. *Nutritive and vassomotor disturbances.*—These disturbances may affect all the enveloping membranes and the media of the eye. Some of them are very rare and have formed the subject of communication of interesting pages of which I will mention the most important.

Injection of the conjunctiva is encountered quite frequently in certain forms of nasal affection. It is an injection of the vessels by a reflex path (vaso-dilatation) produced by irritation of the trigemimus. It explains the long duration of certain forms of conjunctivitis and keratitis and the inefficiency of purely occular treatment. A. Blitz[2] obtained a complete and rapid recovery in a patient with pain and smarting in the eyes, photophobia lachrymation and very tenacious conjestion of the conjunctiva, by simple cauterizations of hypertrophied nasal mucous membrane over the turbinated bones. Numerous cases of conjunctivitis and phlyctenular keratitis coexisting with diseases of the nose, only recover on the disappearance of the latter, for they are dependent upon vascular reflex disturbances.

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[1] Trousseau. *Loc. cit.*

[2] A Blitz. (*Journal of the Amer. Med. Asso.*, May 10, 1890.)

Next to the conjunctival injection are the ciliary neuroses so well described by Lieven[1] and of which he reports a remarkable case. This was a case with a synechia between the right inferior turbinated and the septum. Any congestion of the erectile tissue brought about neurosis. The adhesion was broken, the turbinated cauterized and the ocular disturbance disappeared completely.

Iritis of nasal origin has been well known since the writings of Ziem. His theory of pathogenesis has been much discussed, but several writers consider it a reflex disturbance, and we will consider it here. Ziem, in 1888, was the first to describe a case of iritis connected with a nasal affection. He met with a case of iritis of very painful form in which atropine and calomel had been inefficient for thirteen days. With a syringe an enormous quantity of very fetid pus was removed from the nasal fossæ and immediately the patient experienced a marked improvement in the head and the affected eye. The nasal irrigations were continued and several days afterwards the iritis disappeared completely. In 1889, Ziem observed another case of iritis connected with suppuration of the maxillary sinus. This was a case of recurrent iritis in the right eye, which had led to complete occlusion of the pupil, bulging forward of the iris, hypertension and amaurosis of the eye. Attention was called to the sinus and the hypothesis of an empyema being probable perforation was performed, which revealed pus. Antiseptic irrigation was performed, and one month later the iritis was completely cured. A third case was described by Ziem in 1892. An iritis had absolutely resisted treatment with atropine. The nasal tone of the patient's speech led to an exploration of the nasal fossæ, and it was found that there was a deviation of the septum almost completely obstructing the nostril on the side corresponding to the iritis. With a syringe, Ziem removed quite a large quantity of pus, then removed the projection of the septum, regularly irrigated the nasal fossæ and eight days afterwards the patient was able to resume his work.

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[1] Lieven. (*Deutsch Med. Wochenschrift*, December 1, 1892.)

In 1893, Fromaget[1] communicated to the Ophthalmological and Laryngological Society of Bordeaux a case of iritis following empyema of the antrum of Highmore. Two days after opening the sinus the symptoms of acute iritis had disappeared without any ocular treatment. Fromaget explains these facts by the circulatory disturbances caused by the empyema and reflex nervous disturbances.

Glaucoma resulting from nasal affection is very rare. According to E. Berger in people predisposed to glaucoma, the development of this disease, may be brought about by irritation of fibres of the trigeminus resulting from an affection of the nose. Ziem has observed glaucomatous attacks in cases of suppuration of the nasal fossæ and its neighboring cavities. He describes an interesting case of recovery from glaucoma brought about by simple intra-nasal irrigations. Lennox-Browne[2] gives the history of a woman with glaucoma in whom iridectomy had no effect. A short time afterwards she had an attack of asthma, and on examining the nose some small polypi were discovered, the extirpation of which led to the disappearance of the asthma, of the periorbital pain, and an improvement in the eyes without further treatment. W. Cheatam[3] has seen glaucoma cured by elongation of the nasal branch of the fifth pair, and states that these cases may be the result of a chronic disease of the nose. This is a confirmation of Badal's practice, who very properly recommends in certain forms of glaucoma, elongation of the neighboring nerve, from which he has obtained excellent results.

Exophthalmic goitre is in certain cases clearly linked to a disease of the nose. Hack[4] was the first to mention a very curious case of Basedow's disease coincident with hypertrophic rhinitis. In proportion as he cauterized the hypertrophied turbinated bones, the exophthalmos diminished little by little and disappeared on the side of the cauterized nostril. At the same time, vision increased and the other cardiac symptoms of goitre diminished. Since then several writers, Stocker and Frankel[5] have reported similar cases. Hopman[1] by treating a dry rhinopharyngitis has seen all the signs of Basedow's disease presented by the patient gradually improve.

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[1] Fromaget. Iritis consecutive a un empyeme de l'antre d'Highmore, in (*Annales des maladies de l'oreille et du larynx*, 1894, p. 871.)

[2] Lennox-Browne. (*Loc. cit.*)

[3] W. Cheatam. (*Amer. Pract*, April 2, 1887.)

[4] Hack. (*Loc. cit.*)

[5] Frankel. (*Berlin. klin. Wochenschrift*, p. 111, 1888.)

In all these cases the influence of a nasal affection on the development of Basedow's disease is seen. If the nasal disease is treated, the ocular symptoms disapper. Felix Semon[2], on the contrary, describes a case where this treatment brought on, instead of curing, ocular disturbances. After removal of numerous mucous polypi in a patient there was a sudden development of exophthalmus in the right eye two days after the operation, but with no increase in the size of the thyroid gland, and no tachycardia.

How can we explain the relation existing between exophthalmic goitre and nasal affections? According to Lermoyez :[3] "I will be more forward than Hack and admit the determining influence of the nasal lesion in the production of Graves' disease. But how can this pathological physiology be conceived? Nothing is simpler now, that Basedow's disease is considered a general neurosis which, in the same class as hysteria and epilepsy, may be created or even aroused by nasal disturbances in this circumstance acting as provokative agents in an hereditary neurotic."

I will terminate this study of reflex ocular disturbances of nasal origin by mentioning one more symptom which was observed for the first time by E. Berger in 1887. This is *contraction of the visual field.* This author saw a patient who had been subjected to unskilful nasal cauterization as the result of which there had been necrosis of the right nasal bone, a fistula, and diminution of vision, on the same side. It was found that there was concentric narrowing of the right visual field. This symptom has since been observed by Killian, Bronner, etc. Ziem[4] has seen it in lesions of the frontal sinus, and once in a case of maxillary sinusitis.

How may we recognize the nature and cause of these reflex disturbances? It is necessary, first of all, to make a very careful examination of the eye, of the lachrymal ducts and of the nasal fossæ, in order to eliminate any cause of inflammatory or infectious propagation. I would emphasize the following points: Anterior rhinoscopy should be very carefully performed, as frequently nothing abnormal appears in the nares, no redness and no muco-pus, and one does not see the true origin of the ocular disturbance. If, however, the mucous membrane is concainized, its retraction will frequently show in the lower meatus, underneath the orifice of the lachrymo-nasal canal, a small drop of pus, the sign of an inflammation of the pituitary membrane. This will explain the incorrigible lachrymation, the dacryocystitis, etc., when a rapid and negative examination would have led to the conclusion of a reflex ocular disturbance of nasal origin. Posterior rhinoscopy should not be neglected, and the examination should include the cavum. The permeability of the lachrymo-nasal canals should be investigated. Bacteriological examination of the conjunctival cul-du-sac will sometimes be useful, as it may reveal, in addition to the germs of suppuration, other micro-organisms, as in particular that of ozoene, the presence of which will frequently explain the vague and uncertain etiology of certain rebellious ocular lensions. Finally, ophthalmoscopic examination by showing disturbances due to compression, will eliminate the idea of a neurosis, and suggest the hypothesis of an empyema or a tumor in the sinuses.

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[1] **Hopman.** (*Berlin. klin. Wochenschrift,* No. 42. p. 850, October 15, 1889.)

[2] **Felix Semon.** (*Brit Med. Journ.*, p. 888, April 20, 1889.)

[3] **Lermoyez.** Des accidents qui arrivent a la suite des operations intranassales. (*Annales des maladies de l'oreille et du larynx*, February, 1891.)

[4] **Berger.** (La chirurgie du sinus sphenoidal. Paris, 1890.)

When one has proved the absence of naso-lachrymal propagation and of general disease, and is simply in the presence of a slight deviation of the septum, a spur, a small mucous polypus, etc., he should endeavor to find whether these lesions are the point of the origin of the naso-ocular reflex. For this purpose recourse should be had to the proof of cocainization, which is employed for diagnosing all reflexes of nasal origin. This should be performed in the following manner, which I have seen employed daily in the clinic of my preceptor, Lermoyez, for anaesthetizing the mucous membrane of the nose, the throat and the larynx:

Solution of cocaine prepared in advance should not be used, as they become less anæsthetic and more toxic. It is preferable to make a solution extemporaneously. For this purpose, a determined quantity of hydrochlorate of cocaine (2 centigrammes or example), is dissolved in 20 centigrammes of distilled water, or, better still, $\frac{1}{100}$ carbolic solution (which is readily made with a graduated syringe). With this $\frac{1}{10}$ solution, the nasal mucous membrane is bathed by means of a pledget of cotton on a probe, or forceps. It is known that in addition to its anæsthetic effect, cocaine has the property of rapidly and for quite a long time diminishing congestion of the pituitary membrane. The flux of blood being diminished, swelling of the mucous membrane becomes less pronounced, and on the other hand, the irritation of the sensitive nerve branches being annihilated, one should obtain a temporary disappearance of the ocular trouble. If the lachrymation and blepharospasm cease, it is because the ocular neurosis originates in the nose. In this case, touching the same point with a probe, without previous cocainization, should provoke an exaggeration of the ophthalmic symptoms.

This cocaine proof, which is almost generally adopted, is, however, discountenanced by Ziem, who finds it uncertain and sometimes dangerous. He has, in fact, several times observed a rapid blood flux to the eye.

The pathogenic interpretation of the facts which I have described arises from the anatomical and physiological relations uniting the ocular and nasal systems.

The *physiological* relations between the nose and the eye are well known and of constant observation. Numerous excitations which act on one of these organs, react on the other. DeWecker[1] writes: "An excitation of the nerves in the interior of the nose produces the same reflexes in the eye (hyperæmia and lachrymation), as diseases of the teeth." Every day it is seen that irritation of the pituitary membrane by odors, irritant gases, like ammonia, or the introduction into the nose of a foreign body of an instrument, causes lachrymation.

Reciprocally excitation of the eye reacts on the nasal mucous membrane and causes sneezing, especially in nervous and impressionable people. This reflex disturbance, due to excitation of the terminal branches of the trigeminus, is produced under various circumstances. It has been observed after irrigation of the conjunctiva, or after instillation of colyria.[1] It occurs in some people under the influence of light, and its course of transmission would then be the ciliary nerves. Féré[2] has studied this fact independently. He observed that on closing his four lachrymal points with fine clamps, he was able to expose himself to strong light without sneezing. If the lachrymal points were then freed and resumed their position, there was no longer an obstacle to the flow of tears, and the sneezing reappeared. He concludes from this experiment that in certain cases a double stimulation is necessary to bring about the reflex sneezing which succeeds a luminous impression : First, stimulation of the retina which leads to lachrymation, and second, stimulation of the pituitary membrane by the contact of the tears. This explains, according to Féré, why this reflex does not always occur instantaneously, and why a certain time may elapse between the moment of luminous stimulation and that in which the sneezing occurs.

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[1] DeWecker. (*Traité d'ophthalmogie*, Vol. III, p. 708.)

A fact drawn from *experimental physiology* clearly shows the close connection between these two organs of sense. If one nostril of an animal is obstructed, strabismus with astigmatism and asymetry of the orbit will rapidly develop on the corresponding side.[3]

The *nervous relations* between these two organs of sense justify the reflex phenomena dependent upon stimulation of their terminations. They are established through the opthalmic branch of Willis, one of the three terminal branches of the trigeminus. This nerve furnishes on the one hand filaments to the organs contained in the orbital cavity ; cutaneous filaments to the upper lid, mucous filaments to the lachrymal gland, sensitive ciliary nerves distributed through the deeper portions of the eyeball and they are all united by numerous anastomoses with the motor nerves of the eye. On the other hand, in the anterior and internal part of the orbital canal, it divides into the external and internal nasal nerves, the latter being distributed in particular through the pituitary mucous membrane. It is thus seen that the innervation of these two different organs, the eye and the nose, arise from a common

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1. Feilchenebld. (*Klinische Monatsblätter für Augenheilkunde*, January, 1889.)
2. Féré. (Society of Biology, 1890.)
3. Ziem. (*Monatscher fur Ohrenheilk.*, Nos. 8 and 9, 1893. *Annales des maladies de l'oreille*, July, 1892.)

nerve source and this fact clearly explains the physiological and pathological relations between these two organs.

On the basis of these facts, a pathogenic theory of these reflex ocular disturbances may be formed. According tó E. Berger, these phenomena are the result of a condition of irritation of the terminal organs of the trigeminus. They are in fact only one manifestation of numerous neuroses originating from the nasal fossæ and occurring in predisposed nervous of neurasthenic persons.

The study of these neuroses based on the data of experimental physiology (Brown-Sequard, F. Franck and Laborde), and on clinical observations (relation between mucous polypi of the nose and asthma, etc.) has taken a new impetus since investigations of Hack in 1884. At that time most ocular affections coexisting with lesion of the nose, where the connecting link was obscure, were explained by reflex disturbances. The theory was ingenious and seductive and had numerous followers. When, in fact, one considers the rich nerve supply of the nasal and pharyngeal mucous membrane and the various neuroses originating in them, and on the other hand, the many anastomoses uniting the ocular and nasal systems, and that their innervation is partly common, nothing more will be needed to see in ocular phenomena, such as lachrymation, blepharospasm, etc., phenomena absolutely identical with cough, asthma, headache, etc., that is to say, reflex disturbances. It is necessary to demonstrate the connection and the succession of the pathological phenomenon, and it is here that opinions differ. Hack considers the origin of the reflex as being in the swelling of the erectile tissue. Frankel, Schaffer, etc., state that it originates in the terminations of the sensory nerves of the mucous membrane.

According to Hack and his followers: "Engorgement of the cavernous tissue of the turbinated bones leads to a reflex vaso-dilatory action. Thus to explain the production of exopththalmic goitre following hypertrophy of the inferior and middle turbinated bones, Hack supposes that the irritation of the peripheral organ of the sympathetic produced by swelling of the cavernous tissue causes vaso-dilatation. In his opinion, engorgement of the erectile tissue of the turbinated bones is the condition on *sine qua non* of the so-called reflex symptoms. Moldenhauer[1] confirms these ideas. He thinks that many of the cases muscae volitantes, of temporary amblyopia and of amaurosis are due to serious imbibation of the sheath of the optic nerve of reflex character and originating from the nasal mucous membrane.[2] But soon it was shown (Frankel, Schmaltz, Schaffer) that swelling of the erectile tissue was not necessary to bring about a reflex ocular disturbance. As E. Berger stated, affections of the sinuses where there is no cavernous tissue may produce the same reflex disturbances as diseases of the nasal fossæ. Then the point of departure of these phenomena was in the irritation of the terminal branches of the trigeminus in the mucous membrane.

This excitation may be produced directly by a foreign body (crusts, dried secretions in atrophic rhinitis) or a moveable tumor (small pediculated polypi in particular). In other cases, it is due to dust. Finally, this irritation may be brought about by an inflammatory process in the mucous membrane. Under the influence of various causes, irritation of a nasal filament of the trigeminus, may be transmitted to the nerve centres and thence may react either on another branch of the trigeminus, or on a neighboring nerve and produce in the domain of the latter various disturbances, such as excitation, paresis, paralysis, etc.

We must add that these nervous ocular phenomena of nasal origin follow the laws of reflex action laid down by Pfluger and Chauveau. The eye is always affected on the same side as the nasal region (law of unilaterality). Some times the other eye is affected (law of symmetry), but it is less so than the first (law of intensity).

It is by this nerve theory that E. Berger and several writers explain most of the reflex ocular disturbances of nasal origin blepharospasm, contraction of the visual field, etc. Furthermore, Berger compares these ocular disturbances with those which occur in neuralgia of the trigeminus and finds a perfect analogue. "In neuralgia of the trigeminus we have injection of the conjunctiva, ciliary injection, painful sensation in the eye, photophobia, lachrymation, amblyopia, contraction of the visual field, (Leber) and blepharospasm which may go so far as a convulsive kick (Leber). It should also be stated that neuralgia of the trigeminus, like nasal affections, may be the cause of glaucoma. Also ocular disturbances of dental origin are in part reflex disturbances, produced by irritations of the fibres of the trigeminus, and it is this which happens in disturbances of accommodation, muscular asthenopia, amblyopia and glaucoma (Cracineau). I explained by irritation of the terminal organs of the trigeminus some of the ocular disturbances which are observed in affections of the pharynx and the tonsils, such as lachrymation, blepharospasm and weakness of the muscle of accommodation. The identity of these reflex troubles is evident, whether the neuralgia of the trigeminus be of dental, nasal or pharyngeal origin."

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[1] Moldenhauer. (*Maladies des fosses nasales*, Paris 1888.)

[2] E. Berger. (*Rapports entre les maladies des yeux et celles du nez*, Paris, 1892.)

Ziem (of Dantzig) explains the pathogenesis of changes in the visual field, of accommodation, of iritis, etc., in nasal affections by circulatory disturbances. His theory is founded on the engorgement of the cavernous tissue, forming an obstacle to the return circulation in the orbit and the eyeball. It is in virtue of this principle that he discountenances bathing the nose with cocaine as a method of diagnosis in nervous reflexes. In one patient he has seen these repeated applications bring on an acute attack of glaucoma, which he attributes to a rapid flux of blood toward the eye and intense congestion of the ciliary body.

The nervous and vascular channels may in many cases be the link connecting ocular and nasal affections whether the trouble be purely reflex or due to blood stasis, but one should take into consideration latent empyemas of the sinuses, which are frequently unobserved. It also seems to me that some of these phenomena which we call reflex when the true cause cannot be found, may frequently be connected with the transportation of germs, or the diffusion of their toxine, as is so frequently seen in general pathology.

THE FORMATION OF IMAGES IN REGULAR ASTIGMATIC SYSTEMS.

By Dr. **G. WEISS,**
Professeur Agrégé, Paris Faculty of Medicine.

A refracting or reflecting system is said to be regularly astigmatic when instead of having the same focal distance in all of its meridians, this focal distance has a maximum and a minimum in two meridians perpendicular to each other. It is shown that in such a system the luminous rays parallel to the axis instead of converging after refraction or reflection in a single focus form two straight focal lines. The first of these focal lines is parallel to the meridian of least curvature, and the second to the meridian of greatest curvature. Such systems do not produce images similar to the objects, but there is a lack of sharpness in certain parts, while others are very clear, and, furthermore, the form of the image is altered.

Contrary to what might be supposed the lack of sharpness and deformation are not coincident, but each of these two elements may exist separately. Thus with the same astigmatic system we may at will obtain as image of a clock dial, fig. 1 or fig. 2. The first lacks clearness in certain points, but the general form of the object has been preserved. In the second, there is on the contrary, a deformation; the circle has been transformed into an ellipse with a long vertical axis.

In order to comprehend these phenomena, we will examine a series of cases of formation of images by astigmatic systems, and explain the results obtained.

Take as an object an eight-pointed star (fig. 3) cut in an opaque screen, and placed in a projection lantern. Observe this star through a cylindrical glass of one dioptre with axis vertical. All the branches of the star are no longer clear. We are then in the presence of fig. 1, and it is very easy to represent the appearance of the star from this figure.

Now for the purpose of showing this phenomenon to an audience let us replace our eye by a projection lens (refractive system of the eye) and a screen (retina). We will be astonished to obtain on the screen fig. 4, which in no way represents what we have seen. It is with difficulty that one recognizes the elements of the star. On removing the screen from the lens we can obtain fig. 5, but can never obtain an image similar to fig. 3.

The following experiment will explain this apparent contradiction.

Introduce between the lenses of a photographic objective, a cylindrical lens and we will have a large astigmatic eye of which the retina is the sensitive plate. Photograph with this astigmatic system either the star or the clock dial, and immediately the important role played by the diaphragm will be seen. To become convinced of this, it is sufficient to glance at the series of images figs. 6, 7, 8, 9.

They correspond to a cylindrical lens of 1.5 D. The first image was made with a diaphragm of 30 millimetres, the second 13 millimetres, the third 6.5 millimetres and the fourth 2.5 millimetres.

It is seen that from a completely altered image, one obtains by a simple modification of the diaphragm a final image having only slight haziness in certain lines.

Thus, one can conceive of the differences between images obtained on the retinal screen with a diaphragm as small as the pupil, and projections in the amphitheatre made with lenses of large opening.

These facts may be easily explained.

Let us consider the image of a point in an astigmatic system.

Suppose that ABCD be the square which limits this system and L the luminous point on the axis. This point sends to ABCD a bundle of rays represented by joining L to the borders of the square.

After refraction all the luminous rays pass through the focal

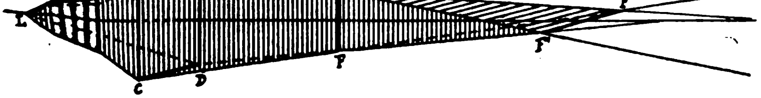


Fig. 10.

line FF. The lines are shaded in order to make this clearer. Then the image of the point L is the vertical line FF. There is a second focal line F'F' horizontal to this, which I will simply mention, and of which the same may be said as of FF.

It will immediately be seen that the size of FF is related to that of AC, that is to say, to the diaphragm, and the smaller the diaphragm, the smaller is the focal line FF, the image of L, and it may be made as small as you will.

By diminishing the height of the lens, FF is diminished, and by diminishing its breadth F'F'.

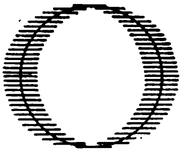


Fig. 11.

But instead of taking the image of a point, let us consider that of a circle. Each point in this circle has for its image in the plane FF a small vertical line, and the total image is obtained by describing a circle, and then drawing through each of its points a small vertical line equal to FF with its middle point in the circle (Fig. 11). From this the role of the diaphragm can be readily understood in its influence on the clearness of the images, and there is no general deformation of the image.

How are these deformed images produced? I will show that this deformation occurs whenever one observes the real or virtual verial image produced by an astigmatic system. This is the case, for example, of a person who observes his own image in a mirror with different curvatures in two meridians perpendicular to each other.

Let us first perform an experiment.

With an astigmatic lens, let us throw on the screen the image of an eight-pointed star. If one of the rays of the star is parallel to the meridian of greatest or of least focal distance, we will have as an image fig. 12. Place behind the transparent screen on which the image is formed a photographic apparatus and the resulting plate will be fig. 12.

New without changing the arrangement, remove the screen and photograph the areal image, using smaller and smaller diaphragms and we will obtain figs. 13, 14 and 15. It is seen that by diminishing the diaphragm a sharper and sharper image is obtained of the eight-pointed star. But this image differs from those obtained in the preceding experiment in that it is deformed ; the vertical ray is much longer than the horizontal ray.

The following seems to me to be the simplest manner of explaining this phenomenon.

Consider an astigmatic refractive system ABCD, and a luminous point P situated in the axis, which will give after refraction a bundle which will be, for example, A*a*, B*b*, C*c*, D*d*. The pupil of the eye will be placed at MN, and a very small portion of the luminous bundle will penetrate the eye. It is sufficient to study fig. 16 to comprehend that a very small portion *mn*, of the system ABCD will be useful for vision of the point P. Everything surrounding this zone *mn* may be disregarded, but it is clear that according to the position of the point P, there is another small zone which will be useful. In particular suppose that this point P is displaced in a vertical direction, it is then clear that *mn* will be displaced vertically ; that is to say, that in order to see all the points of the vertical passing through P, it will be sufficient to have a small vertical band passing through *mn*. All the rest of the system ABCD may be disregarded. In the same way to obtain an image of a horizontal line, it is necessary to have a horizontal band.

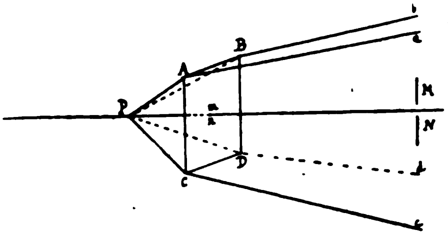


Fig. 16.

Now suppose that it is desired to observe the image of a cross in a refractive or reflective astigmatic system ABCD, for the same reasoning applies to both cases, almost the entire system may be covered with an opaque screen, only leaving a vertical and horizontal band (fig. 17).

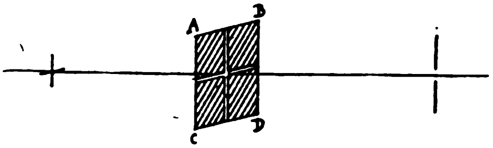


Fig. 17.

Hence it is evident that for the formation of the image of the vertical line, the vertical rays of curvature alone influences the length of this image. The length has the same value as if one had a system of revolution about the principal axis, all the meridians of which were identical with the vertical meridian. On the contrary, for the formation of the horizontal image, it is the same as if one had a system of revolution all the meridians of which were identical with the horizontal meridian.

Suppose then that the vertical meridian has a greater focal length than the horizontal meridian, and let us represent in the same diagram (fig. 18) what occurs in these two planes.

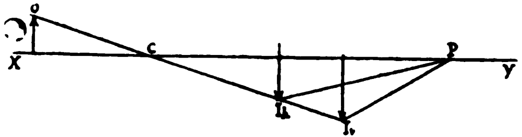


Fig. 18.

Let XY be the axis of the system, C the point where this axis meets the refractive system, supposedly very small, and O the size of one of the rays of the cross. Since the vertical focal distance is greater than the horizontal focal distance, the vertical image will be, for example, I*v*, and the horizontal image I*h*, smaller than the preceding, as would result from the theory of non-astigmatic systems. The eye placed at P, sees I*v* with [illegible] diameter apparently greater than I*h*. The eye will then perceive such an image as fig. 19.

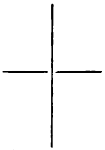
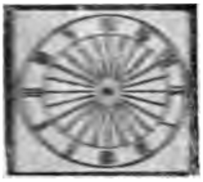


Fig. 19.



g. 1 (and Fig. 8).

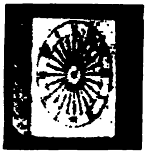


Fig. 2.

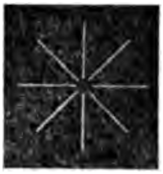


Fig. 3.

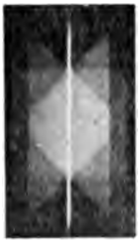


Fig. 4 (and Fig. 20).

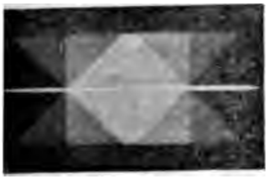


Fig. 5 (and Fig. 22).

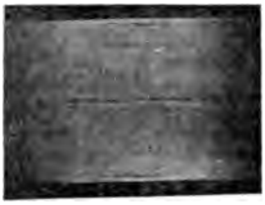


Fig. 6.

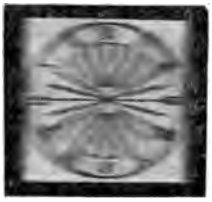


Fig. 7.

(See fig. 4.)

Fig. 24.

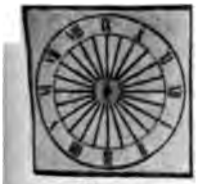


Fig. 9.

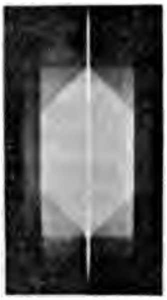


Fig. 12.

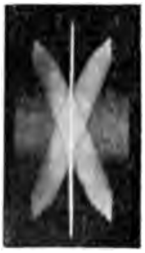


Fig. 13.

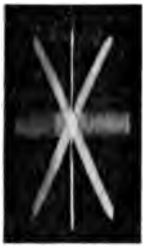


Fig. 14.

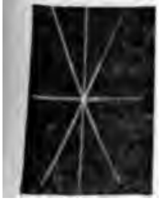


Fig. 15.

(See fig. 4.)

Fig. 20.

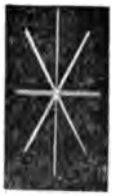


Fig. 21.

(See fig. 5.)

Fig. 22.

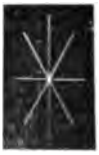
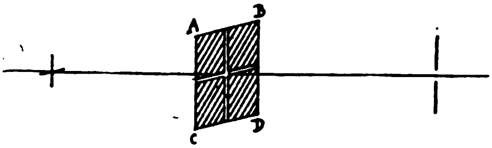


Fig. 23.

N. B.—Figures 10, 11, 16, 17, 18, 19, 24 and 25 will be found interspersed
the text.

may be covered with an opaque screen, only leaving a vertical and horizontal band (fig. 17).



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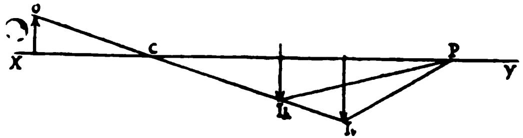

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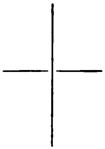
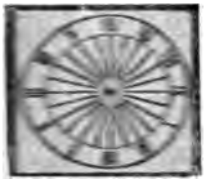


Fig. 19.



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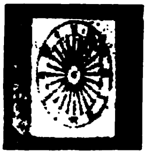


Fig. 2.

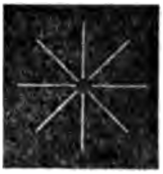
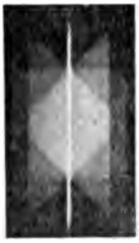


Fig. 3.



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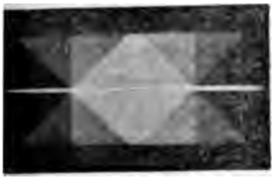

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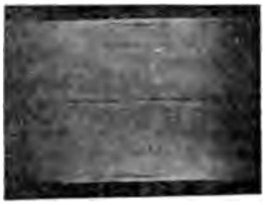


Fig. 6.

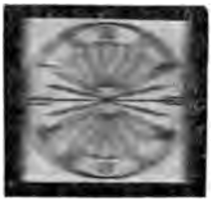
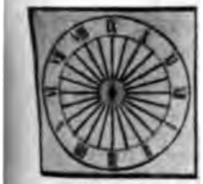


Fig. 7.

(See fig. 4.)

Fig. 24.



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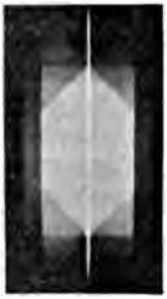

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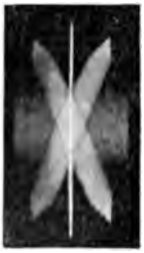

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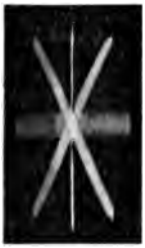

Fig. 14.

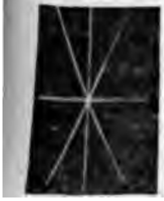

Fig. 15.

(See fig. 4.)

Fig. 20.

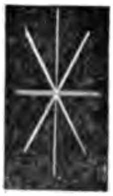

Fig. 21.

(See fig. 5.)

Fig. 22.

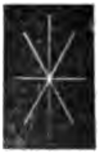

Fig. 23.

N. B.—Figures 10, 11, 16, 17, 18, 19, 24 and 25 will be found interspersed n the text.

It will be asked whether the difference between the distance of the two images, I*h* and I*v*, from the eye will not require a different accommodation in order to perceive the horizontal branch and the vertical branch. This is not so, as the perception of each point of the images is due to the penetration into the eye of a very limited bundle of rays, and the circles of diffusion on the retina are always small.

The result of this demonstration is that for a given position of the object O, the eye always perceives the same deformation whatever be the plane for which it accommodates. There is always an image like fig. 19 formed on the fundus of the retina, which is more or less sharp, but always has the same deformation.

Experience verifies these statements. On observing an aerial image formed by an astigmatic system, one has for a given position of the object an elongation which is always in the same direction.

Here is a very interesting experiment and one very conclusive in this regard.

Place in the projection lantern the eight-pointed star, which has already been mentioned, and form its image through an astigmatic system. Place a screen at the first conjugate position, and we will have on the screen fig. 20. Place behind this transparent screen a photographic apparatus, with a diaphragm the size of the pupil, and we will obtain as a proof fig. 20.

Remove the screen without changing the arrangement, and we will have a new photograph, fig. 21.

But displace the screen so that it comes in the second conjugate image, and also withdraw the photographic camera without changing the focus until it is adapted to the new image on the screen, and we will have as proof fig. 22. Remove the screen and we will have fig. 23.

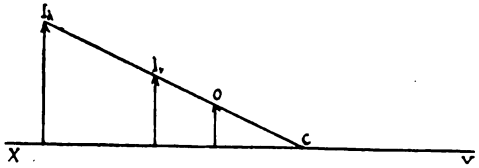

Fig. 24.

This last image has the same deformation as fig. 24, while from an examination of figs. 20 and 22, it would seem that this should not be so, but it is the consequence of the theory which I have stated above.

It may happen that instead of having real images, as is the case in fig. 21, there may be virtual images (fig. 24.)

Then the image I*h* is greater than I*v*, and to see it, it is sufficient to compare the theory of lenses or dioptres. The eye placed at P sees I*h* with a larger apparent diameter than I*v* and there is deformation, (fig. 25).

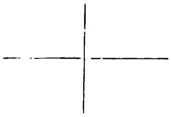

Fig. 25.

It seems to me to be superfluous to draw diagrams of the case of astigmatic mirrors, as exactly the same reasoning holds in this case.

If in the preceding experiment, the cross is replaced with the clock dial, a figure is obtained such as I have represented in fig. 2.

LARGE SUBCONJUNCTIVAL INJECTIONS OF CYANIDE OF MERCURY IN INFECTIOUS KERATITIS.

By Dr. **CAMILLE FROMAGET.**

It is common now to emphasize the severity of infectious keratitis, or of hypopyon, which, unless immediate and intelligent care is given, almost always terminates in enormous leucomas, large staphylomas, and sometimes even suppurative panophthalmitis.

The cornea is protected against infection by its epithelium, which forms a powerful and efficient armor.

But as soon as this covering is encroached upon the eye is threatened with invasion by the germs which cover the surface of the conjunctiva; diplococci, staphylococci and streptococci. Infection is far more to be feared and the prognosis is much more serious, when there is suppurative dacryocytitis. These phenomena have been clinically and experimentally studied by my friend Dr. Mazet of Marseilles.

What is necessary to avoid catastrophe in the presence of a corneal ulceration? To keep this ulcer free from infection, to destroy the germs and to drive them out if they have gained entrance. The first treatment will then consist in irrigation, instillations of colyria and antiseptic ointments.

Sometimes these cares will be sufficient, but it is not always so.

The infection may penetrate into the corneal tissue, into the anterior chamber and into the iris, and then this kind of treatment, which is only intended for the surface of the eye is no longer efficient, and it is necessary to resort to more energetic methods.

In certain cases when the injection is limited, curetting of the ulcer may be performed, a method recommended by my preceptor, Professor Badal, and for years successfully used at his clinic in the Saint Andre Hospital. But when the infection is diffuse and deep, the instrument cannot completely remove it.

One then considers introducing an antiseptic solution into the anterior chamber, and for this purpose two methods are possible.

First, it has been proposed to perform paracentesis of the anterior chamber, and to irrigate it with an antiseptic solution. Such a method seems to me to be unreliable and bad, because there is necessarily danger of injuring the lens after evacuation of the aqueous humor and further because the antiseptic fluid only passes into the anterior chamber.

The other method which I wish to recommend, and to uphold from the cases which I have seen, is that of subconjunctival injections. If the fluids injected under the conjunctiva penetrate the eye, it is possible to keep not only the surface of the eye-ball, but its interior in a condition unfavorable for the development of infectious agents.

At the present time without entering upon the long debates which have been held of late years, every one admits that soluble therapeutic agents injected under the conjunctiva penetrate the anterior chamber. To be convinced of this, one has only to inject a few drops of hydrochlorate of cocaine or of sulphate of atropine.

Subconjunctival injections recommended by Reymond and Secondi in Italy, and by Abadie and Darier in France, were soon tried everywhere.

Almost all oculists have employed sublimate. The results produced in the first injections were not all that was hoped for. I think that this depended upon the fact that the dose of the antiseptic agents employed were too small; two or three drops of a 1-1000 sublimate solution.

In Italy, on the other hand, the results obtained by Sgrosso and Scalini have been most brilliant. (Congress of Palermo, 1895.) They employed the formulas recommended by Secondi:

Sublimate, 0.05 centigrammes,
Chloride of sodium, 0.10 centigrammes,
Distilled water, 100 grammes,

or

Sublimate, 0.05 centigrammes,
Chloride of sodium, 0.10 centigrammes,
Distilled water, 50 grammes.

These writers always injected half or three-quarters of a Pravaz syringe.

By using such large doses, a single one was sufficient in 46 cases. In 8 cases it was necessary to make two injections and only in 4 cases were 3 necessary to obtain a good result.

These writers have also made demonstrative experiments to show that the sublimate penetrates the eye, and no doubt of this can exist.

At the Ophthalmological Congress of this year, De Wecker announced similar results.

"I have treated," he says, "ulcers of the cornea with weak injections of sublimate, and I have treated others by injecting under the conjunctiva the contents of half a syringe, or even an entire syringe full of a 1-2000 solution of sublimate, and the therapeutic result has always been so marked that it is not possible to have the slightest doubt as to the more rapid efficacy of large injections, still more so as I have not employed any other medication."

Thanks to the permission given by Professor Badal, I have studied in his service since June the effect of subconjunctival injections of salts of mercury in keratitis with hypopyon.

I first employed sublimate, the solution being 1-1000.

I injected half and three-quarters of the syringe, that is to say, never less than a demi-milligramme of sublimate, which is a relatively large dose, if one considers that the eye only weighs about 6 grammes.

All the cases resulted favorably.

The injections have inconveniences of which the first of all is pain This may last for several hours, rarely more than three, and gives way to a calm, very delightful to the patient.

There is frequently a palpebral œdema and marked chemosis, which sometimes require six or seven days to disappear. This is probably dependent upon the caustic action of the sublimate and the fact that the compound which it forms with the tissues (albuminates) are absorbed with difficulty.

I have considered whether it was not possible to use a salt of mercury fully as antiseptic and not having the same fault.

I immediately thought of cyanide of mercury.

This salt is extremely soluble, does not affect the instruments and is very rapidly absorbed.

It remains to be seen whether practice confirms theory.

I systematically substituted and continued injections of cyanide instead of bi-chloride, and the results were quite as good.

In no case, have seen an ulcer progress, and I have never seen aggravation produced.

This is a result worthy of being recorded, for all physicians have seen eyes irremediably compromised by infectious ulcers.

The pain after injections of cyanide of mercury is less intense than with sublimate, and the œdema of the lids rarely occurs there being only chemosis.

This is certainly due not only to the nature, but to the quantity of the fluid injected. It is much better to inject the same quantity of antiseptic in the smallest quantity of fluid possible.

I have used two solutions:

1. Cyanide of mercury, 0.25 centigrammes,
   Distilled water, 25 grammes.

2. Cyanide of mercury, 0.25 centigrammes,
Distilled water, 50 grammes.

The latter solution has a germicidal power equal to that of a 1-1000 sublimate solution. It is amply sufficient in nearly all cases. But if one is in the presence of a severe case, where it is necessary to strike quickly, he employs without hesitation the first solution, which is twice as strong.

I have injected as much as one centigramme of cyanide of mercury and never less than half a centigramme without ever having had an accident.

Concentrated solutions have the further advantage that the œdematous boulæ which they cause are smaller and not as troublesome when further injections are necessary.

The following is my method of procedure :

I carefully bathe the entire orbital region, the ciliary borders and the conjunctiva with a 1-2000 solution of formolo, or a 5-1000 of cyanide of mercury.

Then the lids being opened with a blepharostat, I bathe the external surface of the eye and carefully cleanse the ulcer. Then raising the conjunctiva with forceps, I inject at two or three points half a syringe full of a 1-100 solution of cyanide.

I instil a drop of a colyrium of neutral sulphate of atropine and anoint the surface of the eye with an antiseptic ointment of yellow precipitate and apply an occlusive dressing.

On the next day the bandage is removed. If there is improvement, the external antisepsis is continued and occlusive bandage applied. In two or three days if the ulcer has not cleared up and if the hypopyon persist, another injection is made. As soon as the ulcer is seen to clear up, it is useless to continue the injections and the ordinary medical attentions are sufficient to assure recovery.

It goes without saying that if the hypopyon was very large and if perforation was imminent, paracentesis should be performed and should precede the injection. On account of the frequency of iritis the use of atropine should not be neglected.

I have employed subconjunctival injections in eighteen cases of keratitis with hypopyon. The first eight patients were treated with solutions of sublimate, and the others with solutions of

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All the cases resulted favorably.

The injections have inconveniences of which the first of all is pain This may last for several hours, rarely more than three, and gives way to a calm, very delightful to the patient.

There is frequently a palpebral œdema and marked chemosis, which sometimes require six or seven days to disappear. This is probably dependent upon the caustic action of the sublimate and the fact that the compound which it forms with the tissues (albuminates) are absorbed with difficulty.

I have considered whether it was not possible to use a salt of mercury fully as antiseptic and not having the same fault.

I immediately thought of cyanide of mercury.

This salt is extremely soluble, does not affect the instruments and is very rapidly absorbed.

It remains to be seen whether practice confirms theory.

I systematically substituted and continued injections of cyanide instead of bi-chloride, and the results were quite as good.

In no case, have seen an ulcer progress, and I have never seen aggravation produced.

This is a result worthy of being recorded, for all physicians have seen eyes irremediably compromised by infectious ulcers.

The pain after injections of cyanide of mercury is less intense than with sublimate, and the œdema of the lids rarely occurs there being only chemosis.

This is certainly due not only to the nature, but to the quantity of the fluid injected. It is much better to inject the same quantity of antiseptic in the smallest quantity of fluid possible.

I have used two solutions:

1. Cyanide of mercury, 0.25 centigrammes,
   Distilled water, 25 grammes.

2. Cyanide of mercury, 0.25 centigrammes,
Distilled water, 50 grammes.

The latter solution has a germicidal power equal to that of a 1-1000 sublimate solution. It is amply sufficient in nearly all cases. But if one is in the presence of a severe case, where it is necessary to strike quickly, he employs without hesitation the first solution, which is twice as strong.

I have injected as much as one centigramme of cyanide of mercury and never less than half a centigramme without ever having had an accident.

Concentrated solutions have the further advantage that the œdematous boulæ which they cause are smaller and not as troublesome when further injections are necessary.

The following is my method of procedure:

I carefully bathe the entire orbital region, the ciliary borders and the conjunctiva with a 1-2000 solution of formolo, or a 5-1000 of cyanide of mercury.

Then the lids being opened with a blepharostat, I bathe the external surface of the eye and carefully cleanse the ulcer. Then raising the conjunctiva with forceps, I inject at two or three points half a syringe full of a 1-100 solution of cyanide.

I instil a drop of a colyrium of neutral sulphate of atropine and anoint the surface of the eye with an antiseptic ointment of yellow precipitate and apply an occlusive dressing.

On the next day the bandage is removed. If there is improvement, the external antisepsis is continued and occlusive bandage applied. In two or three days if the ulcer has not cleared up and if the hypopyon persist, another injection is made. As soon as the ulcer is seen to clear up, it is useless to continue the injections and the ordinary medical attentions are sufficient to assure recovery.

It goes without saying that if the hypopyon was very large and if perforation was imminent, paracentesis should be performed and should precede the injection. On account of the frequency of iritis the use of atropine should not be neglected.

I have employed subconjunctival injections in eighteen cases of keratitis with hypopyon. The first eight patients were treated with solutions of sublimate, and the others with solutions of cyanide of mercury. Although all the results were favorable, I think it is of no avail to report the cases in detail, and refer the reader to Viallets Thesis (Bordeaux, 1895–96) and to the bulletins of the Ophthalmological Society of Bordeaux, where they are reported. I may say finally that the following conclusions may be inferred from these cases:

Subconjunctival injections of salts of mercury are an excellent method of treatment for keratitis with hypopyon. They may not be sufficient by themselves, and practitioners are wrong to neglect the forms of treatment already known.

But they are valuable because they enable us to bring the antiseptic agent directly and rapidly to bear upon the infected focus. They are the complement of external therapeutics, which alone is not able to avoid a disaster.

Considering that the pain and chemosis are less, and that the final results are quite as good with a solution of cyanide, as with one of bichloride, I recommend for subconjunctival injections a 1-100 solution of cyanide of mercury. Half a Pravaz syringe full is used, that is to say a centigramme of cyanide. In less severe cases, a 1-200 solution will be sufficient. The dose and the injections may be increased and varied according to the case. I have never found it necessary to use more than two injections, while those who have employed weak doses have been obliged to give six or eight. The method of treatment which is quite painful for the patient may also be simplified.

As for the disadvantages of subconjunctival injections, pain, chemosis and subconjunctival ecchymosis, they are not to be considered in comparison with the results obtained.

It is not only in the treatment of infectious ulcers that this form of therapeutics has given good result. I have used it in a case where the success was truly astonishing, and I must confess exceeded all my hopes.

This case was a woman sixty-five years old, who had been operated upon for cataract in the left eye a year before in Professor Badal's clinic. Some time after the operation, a cystoid cicatrix was produced and one day without known cause, without corneal ulceration, and probably through this vicious cicatrix the eye became infected. The patient had hypopyon, numerous synechiæ, photophobia, lachrymation, severe pain in the ciliary region and quite marked chemosis. There was purulent iridocyclitis, the result of which would seem to be fatal.

Without hesitation, I sectioned the cicatrix with a Graefe knife, and resected the borders with scissors. The pus in the anterior chamber was thus evacuated. I introduced a sclerocorneal suture of two silk threads and injected under the conjunctiva half of a Pravaz syringe of 1-100 cyanide of mercury. Recovery was complete in eight days. The pain disappeared in a few hours and the eye was preserved even for vision.

RAPID MEASUREMENT OF THE DIOPTRIC POWER OF LENSES.

By Dr. **E. BAGNERIS** (of Rheims).

The original demonstration of Mr. Prentice, in the November number of these ANNALES, on the lack of neutralization of strong contra-generic lenses has certainly been read with interest. The fact in itself is well known and it is also known that it is dependent on the impossibility of bringing into coincidence the planes of the lenses brought in contact. I devoted a chapter of my general thesis in 1883[1] to the determination of the focal length of lenses. After giving the exact theory of the phacometers of Snellen and Badal, as examples of the use of the general formulas of the dioptric systems of Prof. Monoyer[2], I showed the amount of the error incident to applying the method of neutralization to strong lenses. The calculation is simple.

Calling Φ F_1, and F_2, the respective dioptric powers (that is to say the inverse of the focal lengths) of the resulting system and of the component lenses, and *d* the distance between the interior principal points, we have, in the case where a positive and negative lens are associated :

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[1] **Emploi des verres correcteurs** en ophthalmologie, Paris Thesis, 1883.

[2] **Theori generals des systems** dioptriques centres, by Dr. F. Monoyer (*Societe Francaise de physique*, July 6, 1883.)

$$\Phi = F_1 - F_2 + dF_1 F_2$$

In order that the dioptric power Φ shall be nil, that is to say that the system formed of the two lenses shall be without dioptric effect, we must have, not $F_1 = F_2$, but : $F_1 = \frac{F_2}{1 - dF_2}$ in absolute value.

The negative lens which will neutralize $+ F_2$ should then be $\frac{F_2}{1 - dF_2}$ greater than F_2.

If we have $F_1 = F_2$ the power of the system is always positive and equal to :

$$\Phi = dF_1 F_2$$

With lenses of 20 dioptres where d is not less than 4 millimetres, we will have : $\Phi = 1.6$ D.

The method of neutralization, which is only practical if a sufficient number of standard lenses are at ones disposal, may be advantageously replaced by a little instrument which has appeared so recently that it is not yet familiar to all who are interested in this subject. This is a *spherometer*[1] of special form constructed by the Besancon Watchmakers' Society, the sale of which is reserved to the Paris Opticians' Society. It has the form of a watch in which the ring is replaced by a cylindrical crown with erect border. In the center of the cylinder and moving in the direction of its axis is a small stem the movement of which is transferred to a needle moving about a dial with double division into dioptres and inches. When a plane disc is applied to this stem until the disc meets the crown, the needle should point to zero and this serves for regulation. A concave surface will depress the stem less than a plane surface and the latter necessarily less than a convex surface. It will thus be seen that the extent of the excursions of the needle are dependent on the curvature of the surface and nothing is simpler than to transpose in the graduation of the dial the radii of curvatüre into dioptric powers.

The instrument is graduated between 13 concave and 13 convex dioptres, supposed to be measured on lenses with identical curvatures on both surfaces. It can also measure plano-spherical and periscopic lenses by repeating the operation for each surface of the lens. It is then quite practical for the latter lenses. It is unnecessary to add that the exactness of measurement is independent of the centering of the lens.

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[1] This instrument is different from the so-called Geneva phacometer, described in Cretes' catalogue under the name of "Lens measure" which also measures cylindrical lenses. It is less complete but also less costly.

CATARACT EXTRACTION IN 1952.

By Dr. **L. deWECKER.**

After the historical investigation which I undertook for the purpose of showing the perfection brought to bear on cataract extraction in current practice, almost immediately after the introduction of this operation, investigations which Dr. Sulzer, in the last three numbers of these ANNALES, has pursued in so meritorious a manner by carrying them up to the present time, it will be interesting to go still farther, and to consider what will be the method of operation generally adopted two centuries after Daviel's memorable communication. This will explain the title which I have placed at the head of this article.

What appears to me now as well established is that at the time that he presented his first results to the academy, Daviel had adopted, as the ordinary size of his incision, *half* of the cornea, for in the letter of Thomas Pope, dated September 25, 1752, and published by Sulzer, a letter written previous to Daviel's presentation, he expressly states: "As to the extent of the incision, he says that he seldom makes it above one-half of the circumference of the *cornea transparens.*"

My principal object in entering upon historical investigation of the first period of cataract extraction, was to show that the operators of that period, as well informed and in general more skillful with their fingers than we, had "but a few years after Daviel's discovery already realized the principal modifications in the method," an opinion with which Dr. Sulzer agrees, and which will be approved by all those who undertake similar investigation.

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The nineteenth century has not then added marked changes of Daviel's procedure, unless it be changes in the position of the section, the most important of which had already been indicated, as Dr. Dujardin discovered, by Daviel himself, who finally made an incision without flap directed straight outward.

In the course of this century, Daviel's method has suffered two partial eclipses. This was first the ephemeral reintroduction of depression which did not last beyond the middle of the century, since in the first edition of my treatise I was able without protest to class depression in the historical portion of cataract operation. Then came, as a much shorter phase, but still more intense, linear extraction or rather the investigation of the maximum size of the von Graefe section.

The present generation scarcely knows *de visu*, and by personal experience extraction with a large incision, as it was practised before 1865, that is to say, before the introduction of the von-Graefe operation, and one would be tempted to suppose that those who perform simple extraction operated like our predecessors. I was too intimately involved in the reintroduction of extraction with a large incision to credit this error, and I am the more authorized to correct it, as ten years of my ophthalmological experience (my apprenticeship and my first years of practice) fell in the period which preceded linear extraction, and as I was especially familiar with the method of operation of the greatest masters and operators of our century, all of whom, alas, have disappeared, such as Jaeger, Arlt, Sichel, Desmarres, von Graefe and Bowman.

In reality there is a return to flap extraction, but not to the operative method followed by these great masters, and my present method of operating differs from it in three essential points, namely: (*a*) the size of the incision, (*b*) the method of making it, and (*c*) the method followed for removing the capsule.

(*a*) Those who have with large knives made incisions, including half the height of the cornea, or who have seen such sections made in the ordinary manner, know what skill and what infinite precautions are required for making so large an incision, and with what ease a flap of such dimensions may be displaced. The result is that complete raising of the upper lid is a veritable danger, tending, if it is not separated from the eyeball, to get under the flap. The cystitome, and with greater reason iridectomy, if it is necessary, then become acts essentially perilous, and this is the reason which has led to their suppression, or for leaving, as Desmarres did, a bridge uncut which is detached after cystitomy, with a blunt knife, forming a prolongation of the cystitome, an instrument similar to Weber's knife, where the button is replaced by a cystitome.

With this large flap, so ready to be displaced even by simple closing of the lids, any pressure on the eyeball is dangerous. Then no lid elevators and no fixation forceps can be used under penalty of causing serious risk to the patient, with the least restlessness, or if there is the slightest increase of tension. In this respect it should not be supposed that the use of cocaine can remove these dangers, when the size of the incision reaches half of the cornea.

The opposition to a return to this old size of incision was not the fear of rendering suppuration more easy, nor the difficulty of making large incisions with our very small knives, as Dr. Sulzer supposes, but the desire to profit by the very great advantage given by better coaptation as von Graefe taught in his operative method.

What made the great and rapid renown (although ephemeral) of von Graefe's method was that the marvellous coaptation of the wound which he made did not lead to any spontaneous gapping. In addition to the fact that numerous infections were thus prevented, fixation and the use of the lid elevator became possible during the entire operation, so that less skillful hands could attempt a cataract extraction."

Although Arlt, in his last article on extraction, stated that I have still to furnish the proof that my incision was no more conducive to suppuration than the so-called linear section, yet since then antisepsis has made sufficient progress, so that the following passage of Dr. Sulzer, is self-refuted : "The accusation made for twenty years against a large incision, of being the cause of suppuration, had made too great an impression on the minds of all not to have a powerful influence on the size of the section made by those who had the courage to return to simple extraction.

It is quite certain that at the present time in the full period of rigorous antisepsis, realizing that complete sterilization of the subconjunctival cul-de-sac is not to be attained, consideration will be given to the conditions more or less favorable for coaptation of a wound, and preference will be given to the section presenting the best conditions for rapid and solid cicatrization.

Then while adopting the large incision and taking as its base the horizontal meridian of the cornea, I do not think that one should return to the height of 6 millimetres formerly given to this flap. The third of the diameter of the cornea, that is to say, 4 millimetres, given to the height of the flap with the horizontal meridian at its base, would seem to me proper to give sufficient gapping to admit of the passage of even the largest cataracts. This reduction in the size of the incision, the summit of which is thus 2 millimetres above the circumference of the cornea does not necessitate abandoning any of the advantages of the von Graefe operation, and gives a far more sure guarantee against prolapse and incarceration of the iris as compared with a section approaching nearer the periphery of the cornea, or coinciding with it.

(*b*) Nothing is more erroneous than to state that the use of narrow knives prevents us from a return to the old size of flap, including half the diametre of the cornea. However, I read in Dr. Sulzer's article (page 462, December, 1895): "If our attempts to make an incision of the limbus approaching half the corneal circumference with a linear knife, especially the straight model, the aqueous humor escapes completely before the section is completed. The sharp blade of the knife is then in contact with the iris, and the operator is faced with the alternative of injuring this membrane, or of making an irregular incision." This reasoning is purely theoretical. One may—and I have done it hundreds of times—detach with great exactness and with the narrowest knife half of the cornea, for once the counterpuncture is made, it is very simple by a backward and forward movement of the knife to section the circumference of the cornea with such rapidity that the acqueous humor does not escape until the knife leaves the wound. I have, furthermore, pointed out the great advantages given by the narrow knife in the choice of the counterpuncture and also for variation to be given to the blade for the purpose of passing from a plane section to a direct section, etc., and there is no need of repeating them here.

One error which I have myself committed without correcting others is to believe that a large knife is necessary to make a large section. Quite the contrary is true, and what should be preserved of the von Graefe operation is in particular his narrow knife, which for my purposes I have further reduced to half its breadth. Just as I quickly recovered from my error, when I wished to use a broader knife (double the size) than von Graefe's knife, I am convinced that it will be the same with those who, although warned, fall into the same errors. Large knives have had their day, and certainly they will not be reintroduced in the coming century.

(*c*) I now come to the use of the cystitome, which Dr. Sulzer classes among the principals of the modern operation. The use of this instrument, which I have now completely given up, will certainly not survive in the future century. I am proud of the fact of having made the first capsule forceps, for if Forster has greatly contributed to make the removal of the anterior capsule very common, he only performed this step of the operation in combined extraction, employing Liebreich's forceps with teeth distant from the extremity of the forcep, which could not be used in simple extraction.

Is it a debatable subject that to attain the ideal of extraction, it is indispensable to combine with it removal of the interior capsule? Can it be denied that by so doing the principal causes of the formation of secondary cataract are suppressed? Consequently should not all our efforts be directed to the easiest and most complete method of removing the anterior capsule? What has been up to the present time opposed to the general adoption of this veritable advance in cataract extraction is routine and it also must be said a certain difficulty in the performance of this step. In Germany, where combined extraction is still much in favor, the use of Forster's capsule forceps is very common, and it must be granted that their use along an artificial coloboma of the iris is very simple. It is otherwise when simple extraction is performed, and here the managment of my capsule forceps is in reality a delicate act to prevent dislocation of the lens, or grasping the iris in its passage. But with a little practice, one quickly succeeds in surmounting these difficulties and in thus adding a most important step to the performance of the operation.

There is no doubt in my mind that with further instrumental perfection, simple incision of the capsule will be definitely abandoned in the coming century, and that all efforts will be devoted to carefully removing the anterior capsule in its entire extent. My views then differ in several points from my colleague Sulzer, who closes his valuable historical investigations by stating: "Thus we arrive at the following principles for the modern operation for cataract extraction: Daviel's incision made with a large knife, fixation of the eyeball, and of the lid, and the use of the cystitome." If in 1952, cataract extraction is still performed (means not having been found for preventing or dissolving it), the section of half the cornea will be made with reduction in the heighth of the flap to one-third of the corneal diameter. Very narrow knives will be used in making the incision, and incision of the capsule will not be performed, but its removal.

MY DEAR FRIEND:

I am greatly pleased that you have been willing to shed the light of your rich experience on the historical investigations of cataract extraction, published in the November and December numbers of these ANNALES. Our differences of opinion refer especially to the question whether it is more advantageous to employ a narrow or broad knife in making a large incision. My experience cannot be brought into competition with yours, but was it by chance that all the great masters of the century, Demours, Wenzel, Desmarres and Roux, employed broad knives and not one of the narrow models of knives which were already numerous at that time? It was especially of them that you must have thought in speaking of "the operators of that period who were as well informed and in general, more skillful with their fingers than we."

I am perfectly in accord with you in regard to the use of capsule forceps. The word cystitome in my article should be taken in the general sense of the word, as an instrument serving to open the lens capsule, and the only question which I have wished to settle, was whether it was better to employ such an instrument, or to open the capsule with the keratotome while passing through the anterior chamber.

Yours, etc.

SULZER.

MONOCULAR TEMPORAL HEMIANOPSIA FROM ACUTE COCAINISM.

By Dr. **SALIS.**

The important question of functional disturbances of vision in their relation to cortical lesions of the brain has been the object of much controversy, more than one point of which remains obscure in spite of the accumulated writings of physiologists and pathological anatomists.

It seemed to me to be of interest in this regard to communicate the following observation, all the interest of which rests not in the morbid phenomenon observed, but in the interpretation which it would seem to require.

One of my colleagues, forty-one years of age, reported the following fact to me, which he had lately experienced himself. About three o'clock in the afternoon, while walking, he suddenly experienced a disturbance and confusion of vision about ten minutes after taking two tablets of cocaine containing a dose of 1 centigramme each. As he had already made some study of ophthalmology, he endeavored to analyze the phenomenon, which without greatly disturbing him, since he experienced no general trouble, prevented him from working. Alternately closing each eye, he found that the entire right visual field was normal, but that with the left eye he only perceived objects situated at his left. Only the right portion of the visual field of this eye was preserved, with the point of fixation and a narrow band corresponding to an angle of about 10° outside of the vertical line, passing through the point of fixation. In other terms, vision no longer existed in the entire left portion of the visual field, and, a remarkable fact, the line of demarcation of the hemyopic scotoma appeared to be regular and vertical. There was then left temporal monocular hemianopsia. Repeated experiments always gave the same result. It was only after three and one-half hours that the left visual field regained its normal dimensions.[1]

I must add before continuing that an effort to reproduce the same phenomenon by the use of cocaine tried in my presence and under identical conditions produce no result.

The productive cause of this hemianopsia without headache or dizziness cannot be attributed in spite of its temporary character to an attack of myopic migraine. It seems to have been due, considering its passage. But with a little practice, one quickly succeeds in surmounting these difficulties and in thus adding a most important step to the performance of the operation.

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The productive cause of this hemianopsia without headache or dizziness cannot be attributed in spite of its temporary character to an attack of myopic migraine. It seems to have been due, considering the absence of all other disturbance, to the action of the cocaine, although the dose of 2 centigrammes (admitting that the doses of the tablets were exact) was weak and that writers give as the minimum toxic dose in the digestive tract, quantities of 4 to 6 centigrammes. But individual susceptibility must be considered, as it is quite variable in respect to toxic doses of this substance. And on the other hand, the appearance of the visual disturbance ten minutes after ingestion, and its persistence for three and a half hours, coincide perfectly with the duration of the disturbances provoked by cocaine (Rossol imo). It may seem extraordinary that the use of this anæsthetic so general to-day, has not before furnished a case of similar disturbance. At least my bibliographic investigations have not discovered a single case of this kind. G. See, in his article on the disturbance of cocaine (med. mod., September 10, 1891), only mentions as ocular disturbances in giving statistics of 99 cases of poisoning of Mannheim, and 106 cases of Falk, hallucinations of vision and blindness with dilation of fixation of the pupil.

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[1] Perimetrical examination revealed no contraction of the visual field.

How can we explain the production of this hemianopsia? Is it by the direct action of cocaine on the cerebral region, which from the writings of Golgi, would seem to be capable of modifying the nerve cells? It seems far more probable, from the characteristic symptoms of vascular contraction observed in certain cases of cocaine poisoning (syncope,.extreme pallor of the face and mucous membranes, vertigo, etc.), that the mechanism of the production of this regular scotoma may be attributed to a vaso-motor disturbance provoked by a spasm of arterioles, symptoms of cerebral anæmia limited to a portion of this organ. As for the position of the arterial constriction it can only be cortical, or act on the fibres which unite the visual centre to the external geniculate body.

This leads us to the question of monocular hemianopsia considered in itself. De Wecker and Landolt, in their great treatise (88), only give a few vague indications on this subject and attribute this hemianopsia to neuritis. Others consider it as the consequence of cerebral hemorrhage. On the other hand, the Dictionnaire of Dechambre (1888) formally denies the existence of this form of scotoma. Vialet (Paris Thesis, 1893) says that there has never been a case of it in man. P. Janet described in a clinic (January 25, 1895) a case of hysteria with nasal hemianopsia who could only see half of objects while with binocular vision she could see them perfectly, but with a more or less dark band in the centre. This monocular hemiopia, complicated at times with hemi-diplopia, hemi-macropsia, or again with hemimicropsia always monocular, arises from the fact that the patient disregards the sensations of one eye.' Janet, without attempting to give an anatomical explanation, thinks that this form of visual field, otherwise contracted, is caused by a fixed idea of the patient Finally Nimier and Despagnet (Traité d'opht.) say "that there is no well-established observation of monocular hemianopsia related to a change in an opto-psychic centre."

To arrive at an interpretation of this phenomenon and a proper deduction, that is to say, the doctrine of the protection of the direct optical fibres in a different cortical region from that of the bundle of crossed fibres, it seems to me that this chance case of poisoning has realized the interesting physiological experiment of suspending the function of a cortical centre while respecting the neighboring parts. G Rossolimo (Arch. de psych., de neurol, et de med. leg., 1894, Vol. XXVII), impressed with the insufficiency and imperfection of different experimental methods in the investigation of cerebral localizations, has already profited by the well-known toxic properties of cocaine as a brain poison. It seems proper, then, in the case just described, to attribute the hemianopsia, as I have already said, to the suspensory action of cocaine on the visual centre by means of temporal anæmia.

Without contradicting facts already known, is it possible to admit of the possibility of projection of the retina on the visual sphere? Von Monakow, in connection with this theory, has stated that lesions very different in extent in the region of the termination of the optical conductors in the grey cortical substance cause identical visual disturbances. After him, Vialet (Paris Thesis, 1893), on the basis of investigations in pathological anatomy, reaches the same conclusions. In his opinion everything seems to prove the intimate connection in optical radiations between the direct and crossed fibres, which both terminate in the cortical visual sphere.

This, however, is not the general opinion. Munk, as the result of experiments on dogs and monkeys, has concluded that there is a separate origin in the cortex for the two kinds of optical fibres. Lannegrace, in his investigations, reported at the Congress of Nancy (1886) says, without positively affirming it, that Munk's visual centre seems to be related in its external lateral portion to the external half of the retina and in its internal lateral portion to the internal half of the retina. Schaefer, Hun and Doyne favor projection of the retina in the visual sphere. Henschen (of Upsal) (*Rev. gen, d'opht* , 1894, No. 8) disagree with Vialet's theory as to the distribution of the direct and crossed fibres in indistinct centres. In his opinion this projection exists in the calcerine fissure in such a way that the inferior lip of the fissure corresponds to the superior visual field and the superior lip to the inferior visual field.

This question, it will be seen, is not defiantly established. Opposition, it is true, might be made to Munk's theory that in addition to the difficulty of analyzing the different forms of hemianopsia in a monkey there is a possibility that the arrangement of the optic nerve is different in man from what it is in animals. However, the main fact in my case can not be disputed. It shows a possible relation between the various cortical regions, considered from a functional standpoint, and the different vascular territories of the pia mater, considered independently of their anastomoses. If there is not anatomically a close projection of the segments of the retina in a limited portion of the visual sphere, the action of cocaine in this particular case seems to be very difficult to explain.

In conclusion, I may add that I consider this case of pure monocular hemianopsia as a strong argument in favor of the doctrine of projection of the retina in the visual sphere. The only things lacking in this observation were a complete perimetrical record and a study of the pupillary reflex. Perhaps it will soon be possible, now that this accident due to cocaine has been reported, to find other cases, which will furnish a more complete study of this phenomenon, and consequently lead to a more correct interpretation.

II.—REPORTS OF SOCIETIES

SOCIETIES

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Session of March 12, 1896.

Leprous Keratitis.

MR. KENNETH SCOTT (Cairo).—In an Egyptian, who had suffered from anæsthetic leprosy for a number of years, I found a paralysis of most of the muscles supplied by the seventh nerve. The patient was unable to close the eyes, which were therefore exposed to all external irritations. There was a diffuse infiltration of the inferior portions of the cornea, both of which showed a group of three or four nodules, covered by epithelium. Similar nodules were observed in another case of leprous keratitis. In the patient here spoken of, the corneal affection might have been attributed to the lack of protection, had the groups of nodules not been present.

Relapsing Paralysis of Ocular Nerves.

MESSRS. ORMEROD and HOLMES SPICER.—In three of the seven cases observed, the paralysis affected the third nerve. These patients were subject to periodic attacks of hemicrania, accompanied by nausea and vomiting; the severity of these attacks was very variable. The lighter attacks lasted only a few hours, while the severer continued for some days, and terminated in a more or less complete secondary paralysis of the third nerve of the same side.

In the first attacks the paralysis completely disappeared, but after a number of relapses, a permanent paralysis of some branches of the third nerve remained. In one of these cases there was a partial atrophy of the optic nerve of the same side.

In another there was observed a double relapsing paralysis of the third nerve, following a long period of periodic headache, and terminating in a complete double external ophthalmoplegia. In the other cases the sixth nerve was affected; in one of these patients there were some symptoms on the part of the seventh nerve, and in another the third shared in the paralysis.

We think that these cases have been wrongly classified as migraim; the characteristic symptoms of this neurosis, such as the hemianopsia, the scotoma, or scintillating scotoma, together with the motor phenomena and the persistence of the paralysis indicate a lesion of the centre, situated in the base of the brain, an opinion which has been confirmed by autopsies.

Reflex Amblyopia During Pregnancy.

MR. LAWFORD KNAGGS.—The patient, at the age of thirty-two, lost vision in the left eye during a pregnancy. When I examined her for the first time, this eye was divergent and could not perceive light. The ophthalmoscope showed atrophy of the optic nerve. She had then had four children. At the age of forty, being four months pregnant, the patient presented a rapid diminution of vision in the right eye, going from $\frac{6}{12}$ to simple perception of the movements of the hand, with loss of color perception, and concentric contraction of the visual field; the fundus was normal.

Premature labor was induced, and six months later vision had returned to normal, while the field of vision still showed a loss in the right inferior quadrant. Color perception was normal; the optic disc showed partial atrophy. A year later, in another pregnancy, the patient presented a new enfeeblement of vision, with concentric contraction of the visual field, but without alteration of color perception. Induction of labor again leads to the restoration of vision and the visual field, with the loss, this time, of the right superior quadrant.

The affection is due to imperfect nutrition of the retina, following a vaso-motor contrition of the vessels of the choroid. The prognosis is grave. When there is loss of vision with concentric contraction of the visual field, the termination of pregnancy is necessary to escape an incurable blindness.

BIOLOGICAL SOCIETY.

Session of March 14.

On the Fibres of Association of the Centres of Motor Oculi Nerves.

DR. THOMAS.—In the course of experiments upon the cerebellum and cerebral pednucles, producing destructive lesions of these parts by the galvanic current, it has happened twice, once in a guinea-pig, once in a rabbit, that I have destroyed at the same time the nucleus of the fourth nerve of the same side. As the animals survived for some time, I have been able to study in serial sections the degenerations secondary to destruction of this nucleus, and especially of those fibres which unite it to the third nerve.

Dr. Mathias Duval and Laborde are said to have demonstrated that there exists anatomical and physiological connections between the nucleus of the fourth nerve of one side, and that of the third nerve of the other. They think that the association fibres, leaving the nucleus of the fourth nerve, follow the posterior longitudinal tract of the bulb and cross the median line only as they pass into the nucleus of the third nerve. But in our experiments we have seen that the degenerated fibres are found in the posterior longitudinal tract of the side opposed to that of the lesion. This shows that the association fibres cross the median line much earlier than Drs. Duval and Laborde thought.

BELGIAN ACADEMY OF MEDICINE.

Session of February 29.

DR. NUEL.—According to recent investigations upon filamentous keratitis, superficial punctate keratitis and ulceration of the cornea with hyopyon, it can be affirmed that the pathological anatomy of corneal affections is still undetermined. Up to the present time we have had to content ourselves with applying to the human cornea the results of experiments made upon the cornea of animals.

In superficial punctate keratitis, Dr. Nuel has described as the principal lesion a collection of spiral pilaments, situated superficially in the cornea, to which nothing analogous is found elsewhere. In a new observation of this nature, he has found that the spirals in question proceed from a nest of bacteria (cocci), situated on the corneal surface, and consisting of as pure a culture as any made upon gelatine. The spirals of Dr. Nuel seem, therefore, to be a bacterial product, and superficial punctate keratitis is a typicæ but very peculiar microbic disease.

He finds some analogy between his spiraes and the spirae formation, still unexplained, described by Loeffler and Sakbaroff in bacterial culturis, which he has been able to study in a preparation supplied him by Dr. Malvoy. These spirals may be the detached cilia of bacteria, which have acquired unusual size.

Action of Light upon the Nerve Elements of the Retina.

DR. PERGENS.—The action of light has been studied in the fish (Leuciscus Rutitus) by Dr. Pergens. Preparations obtained from illuminated and non-illuminated retinae were subjected to exactly the same manipulations, so as to justify comparison between them.

The author noted the modifications occurring in the pigment layer: these were photographed from nature. In the non-illuminated retina the pigment mass is compact, forming a zone in the fringes which lie in contact with the rods and cones: in the illuminated eye the distribution of pigment is changed; it forms two zones united by lines separated by a clear background which corresponds to the central portion of the body of the epithelial cells.

The researches of Dr. Pergens are confined to confirming in many points the results obtained by F. Ball, Kühne, VanGendirea Stout and many other authors. They introduce into the subject many new elements, especially concerning the partial displacement of the retinal epitheliun under the influence of light, and above all regarding the consumption of chromative in the granular and gaugeroric strata of the retina. The latter has been demonstrated with accuracy by the use of many tests.

The diminution of chromative in the nerve cells of the psycho-optic centre of the dog by the functional action of the eye was demonstrated two years ago by Mann at Oxford: the retraction of the protoplasam of the cells of the cerebral cortex in activity has likewise been established by Drs. Lugaro and J. Demoor. The researches of Dr. Pergens allow us to follow in detail the modifications produced by light impressions upon the retina; they demonstrate the analogy of the reactions produced in the cortical and retinal neurous by the excitation of light.

III. REVIEWS OF OPHTHALMOLOGICAL JOURNALS.

Archives of Ophthalmology.

Reviewed by Dr. SULZER.

Vol. XXIV, No. 4.

I.—Observations on Cases of Hemichromatopsia, Indicating the Nonexistence of a Separate Cortical Color Centre, By DR. WARD A. HOLDEN.

Observation of cases in which, with a normal field for large white test-objects, there was hemianopsia for colors, have led to the supposition of the existence of a separate cortical centre for the color sense. By modifying the methods of examination of the visual field and of the color field the writer concludes that the color perception diminishes proportionately with the light sense and that the supposition of a separate centre for perception of colors is inadmissible.

In his permetric experiments he used three patches, 1 *cm* square, one of pale green, one of saturated red, and one of saturated blue, placed on separate gray cards, each card having the same light intensity as the color. The green could be seen 25° temporally in the horizontal meridian, the red 50°, and the blue 75°. Also three gray patches were prepared on a white ground, having such an intensity that each gray patch had as large a field as one of the colors, and three black dots of different sizes on a white ground were so prepared that each dot was seen in a field as large as that of one of the colors.

In a normal eye and in most cases of amblyopia, with a given illumination, the black dot, the gray patch and the color were each seen over an equal area of the visual field. The exceptions were retinitis pigmentosa in which the color fields are reversed and some cases of optic nerve disease.

In two cases previously reported—one with the field for white complete, and the other with a slight contraction to the temporal side—

there was bitemporal hemianopsia for all colors and for all three black dots and gray patches. But with dots slightly larger and with patches slightly darker the field in one case was complete and in the other nearly so.

It thus appears, in cases in which there is bitemporal or incomplete homonymous hemianopsia for white, that the eyes are also unable to distinguish from white the black dots and gray patches which are not seen by the normal eye in parts of the field in which the corresponding colors are not recognized.

II.—On Choroidal Tumors, by Dr. MITVALSKY.

Dr. Mitvalsky publishes a number of cases which show that there are flat sarcomata of the choroid that only develop laterally and that may involve the entire uveal tract and yet never fill the interior of the eye, but may readily give rise to episcleral nodules.

In the first case, a sarcoma of this nature, occurring in a person sixty-six years old, did not exceed 1 millimetre in thickness after two years growth. It was composed of round, oval and spindle sarcoma cells but at some points had the appearance of a dense fibroma and at others that of a soft fibroma passing over into a myxoma. In addition to the sarcomatous portions there were strands of new-formed unstriped muscle and pigment. The pigment was not in sufficient quantity that the tumor could be called melanotic.

In a second case a flat sarcoma of the choroid gave rise to the formation of sarcomatous nodules in the anterior portion of the retina and fibrous redegeneration of this membrane. The primary sarcoma was situated in the macular region. From there the sarcomatous elements invaded the layer of pigment cells causing sarcomatous degeneration and, spreading laterally, produced secondary nodules in the ora serrata.

III.—Contributions to the Knowledge of the Histological Alterations in the Retina after Experimental Injuries, by Dr. TEPLJASCHIN.

The writer made incisions in the retina with a discision needle introduced through the sclera to the opposite side and also incisions involving the entire thickness of the eyeball with a cataract knife. In some cases the galvano-cautery was used. The experiments were performed on rabbits and strict antiseptic precautions observed.

Every injury to the retina is a serious affection. Not only does the portion of this membrane directly destroyed by the injury never become regenerated, but there is atrophy of the surrounding nerve elements. The portions of the retina situated peripherally to the injury loose their function.

IV.—The Palperal Form of Spring Catarrh, by Dr. H. GRADLE.

In 1886, Dr. Gradle published under the title "Periodic Disease of the Conjunctiva Allied to Hay-fever," the history of four cases in which a disease of the conjunctiva of the upper lid answered to the characteristic description of spring catarrh but without the circumcorneal lesion. Since then he has seen eight more cases of this disease in only one of which was there a circumcorneal lesion. Hay-fever played no role in the etiology of these eight cases. The attacks commenced in childhood and since then have reappeared with the commencement of each warm season. The writer's experience confirms the well known fact that a journey to a cold climate may prevent the appearance of the annual attack.

V.—A Case of Diphtheritic Conjunctivitis Presenting Unusual Complications Treated by Antitoxin, by Dr. J. GUSTMANN

A case of pseudo-membraneous conjuntivitis complicated with ulcer of the upper lid and the cheek. No bacteriological examination was made.

VI.—A Dermoid Tumor Involving the Cornear, by Dr. BROSE.

VII.—A Case of Successful Extraction of a Piece of Steel from an Iris in which a Plastic Inflammation had been Established, with prompt Subsidence of the Inflammatory Reaction and Restoration of full Vision, by Dr. HECKEL.

VIII.—Report and Experiences of an Itinerant Cataract Operator at the End of the Nineteenth Century, by Dr. WALTER

Outside of the large towns oculists are very rare in Russia. There are districts of two or three millions of inhabitants without a single oculist. Professor Belljarminow has, since 1889, regularly passed his vacations in the province of Saratow, where during the first three years he treated 1110 patients. These results have led to a proposition to the Society for the Prevention of Blindness to send oculists every year for one or two months into the different parts of the empire.[1] Dr. Walter gives a report of the work of one of these "itinerant oculists." Trachoma forms the largest percentage of the diseases treated. Of 2154 patients 645 were thus affected, and probably a portion of the 451 cases of chronic conjunctivitis should be added to this number. There were seven cases of spring catarrh, which is a very large proportion.

Dr. Walter states that only a small part of the diseased persons in the provinces consult these itinerant oculists, but thinks that these flying expeditions are capable of doing a great deal of good.

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[1] This organization of *Itinerant oculists* was described in *Annales d'Oculistique*. Vol. CXII, p. 159.

IX.—Light, the Ointment of Yellow Oxide of Mercury, and the Ointment-Pots in Common Use, by Dr. HOLTH.

To prevent decomposition of yellow oxide ointment, it is necessary to preserve it in perfectly opaque jars closed with opaque covers. It seems that the red rays do not cause decomposition.

X.—Diplopia in the Periphery of the Field of Fixation and Its Bearing on the Diagnosis of Muscular Paralysis, by Dr. A. DUANE.

Contrary to the opinion of Dr. Alling (see these ANNALES, Vol. CXIV, p. 476, Dr. Duane maintains that diplopia in the peripheral portion of the visual field (see these ANNALES, Vol. CXII, p. 281) which he lately described and interpreted, should be attributed to paresis of one of the superior recti muscles. He does not, however, deny the existence of physiological peripheral diplopia described by Alling.

Recueil d'Ophtalmologie.

Reviewed by Dr. DE BOURGON.

January, 1895.

I.—Monocular Diplopia in Hysteria, by Dr. LAGRANGE.

A case of monocular diplopia of cerebral origin not due to contraction of the ciliary muscle. The phenomenon is accounted for by an hallucination of hysterical origin.

II.—Ophthalmological Studies, By Dr. CHAUVEL. (To Follow.)

III.—Extra-Ocular Injury from a Bird Shot; Blindness and Paralysis of the Common Oculo-Motor, by Dr. BOURGEOIS.

February.

I.—Tertiary Syphilitic Appearances in the Eye, by Dr GALEZOWSKI.

II.—Treatment of Granular Conjunctivitis with Electricity, by Dr. MALGAT.

The writer reports twelve more cases of complete recovery. Corneal inflammations recovered at the same time as the granulations. It is scarcely necessary to pay any attention to the corneal disease during electrical treatment. Ten to fifteen applications of electricity are necessary. The apparatus consists of a Gaiffe machine with continuous current, the positive electrode of brass and the negative pole communicating with a steel needle which is applied for a few seconds to each granulation.

The current should be from 5 to 6 milliamperes, and should be applied after cocainization. The operation is repeated two or three times a week. After each sitting the eye becomes red and highly congested but this only lasts a short time and in a quarter to a half an hour all disappears.

III.—**Ophthalmological Studies,** by Dr. CHAUVEL. (To Follow.)

March.

I.—**Ophthalmological Studies,** by Dr. CHAUVEL. (To Follow.)

II.—**On Hereditary Ocular Syphilis,** by Dr. GALEZOWSKI.

III.—**Relative Insensibility of the Cornea in Irido Cyclitis,** by Dr. TRANTAS.

The visual field and the tension were always examined with great care. The patients used no anæsthetic collyrium.

Insensibility of the cornea was found in one case of diabetic irido-cyclitis, one case of lymphatic irido-cyclitis (serous iritis), and one case of syphilitic irido-cyclitis.

April.

I.—**Note of the Ocular Affections Encountered During a Journey in Persia,** by Dr. GALEZOWSKI.

II.—**On the Coincidence of Temporal Heteronymous Hemianopsia and Diabetes Insipidus,** by Drs. SPANBOK and STEINHAUS.

In 50 cases of temporal heteronymous hemianopsia, 11 cases are noted as having polyuria, but on careful study of the descriptions of these cases one is forced to the conclusion that only one is indisputable and that the others are either doubtful or do not belong in the category in which they are placed. This is natural as the points lesions of which cause temporal heteronymous hemianopsia and diabetes insipidus are not near enough to each other to admit of a common focus being the cause of the two diseases.

Drs. Spanbok and Steinhaus have observed a case of coincidence of temporal heteronymous hemianopsis and diabetes insipidus in a woman thirty-three years old. The patient was syphilitic. Parenchymatous injections of sozoiodolate of mercury and iodide of potassium brought about a complete recovery.

III.—**History of an Old Obstinate Lachrymal Fistula,** by Dr. ARMAIGNAC.

A fistula of five years duration was cured by as complete curetting as possible of the entire internal surface of the fistula, removal with a knife of a funnel shaped cutaneous ring surrounding the fistula and extended to a depth of 4 to 5 millimetres, and suturing the lips of the wound with three metallic sutures introduced as deep as possible including both the skin and a good thickness of the subjacent tissue. Over it was applied a layer of steresol and every day a Bowman's sound was passed. In eight days the sutures were removed and the recovery has been permanent for nine months.

IV.—**Ophthalmological Studies,** by Dr. CHAUVEL. (To Follow.)

May.

I.—**Double Retinal Detachment in a Child Four Years of Age,** by Dr. TEILLAIS.

(See ANNALES D'OCULISTIQUE, Vol. CXIII, p. 337.)

II.—**On the Best Method of Treatment of Prolapse,** by Dr. GRANDCLEMENT.

(See ANNALES D'OCULISTIQUE, Vol. CXIII, p. 340.)

III.—**Iritis of Nasal Origin,** by Dr. FAGE.

(See ANNALES D'OCULISTIQUE, Vol. CXIII, p. 341.)

IV.—**Results of the Operation for Entropion and Ptosis by the Methods of Gillet de Grandmont,** by Dr. BOURGEOIS.

(See ANNALES D'OCULISTIQUE, Vol. CXIII, p. 353.)

June.

I.—**Retinal Hemorrhages in a Case of Hereditary Hæmophilia,** by Dr. VIALET.

(See ANNALES D'OCULISTIQUE, Vol. CXIII, p. 356.)

II.—**Treatment of Conjunctivitis by Prolonged Sub-Palpebral Irrigations,** by Dr. VACHER.

(See ANNALES D'OCULISTIQUE, Vol. CXIII, p. 359.)

III.—**Annular Scotoma in a Typical Case of Pigment Retinitis,** by Dr. TRANTAS.

The case of pigment retinitis is typical and there is a zonular scotoma. This scotoma, which is very rare, has been found in pigment retinitia, hyperæmia of the retina resulting from dazzling by electric light, saturnine hemiplegia, specific chorio-retinitis and disseminated choroiditis.

IV.—**Anterior Synechiæ; Synechotema; A New Instrument,** by Dr. GAUPILLAT.

A patient should never be left with an anterior synechia which may cause trouble.

Accidents may occur by sectioning the synechia from behind forward in forcibly drawing the iris into the operative wound. On the other hand there is uncertainty as to the destruction of the entire synechia in operating by tearing it off and iridectomy and vision is bad by reason of a regular astigmatism and a large pupil divided in half by an opaque spot. Hence synechotomy, which was advised by Desmarres, should be the operation of choice and this operation deserves better than the disfavor, not to say oblivion, into which it has fallen.

V.—**Gongenital Ophthalmoplegia Externa,** by Dr. GUENDE.

(See ANNALES D'OCULISTIQUE, Vol. CXIII, p. 355.)

July.

I.—Detachment of the Retina and its Treatment, by Dr. GALEZOWSKI.

(See ANNALES D'OCULISTIQUE, Vol. CXIII, p. 337.)

II.—Ophthalmological Studies, by Dr. CHAUVEL. (To Follow.)

III.—Amblyopia Caused by the Use of Stramonium, by Dr. DI CERILLO.

This was the case of a patient twenty-two years old whose sight had diminished for a year. There was a central scotoma with good peripheral vision and discoloration of the disc. The media and the membranes were normal. The affection was due to immoderate use of cigarettes of datura stramonium which had been employed for attacks of asthma.

The cigarettes were discontinued and there was total recovery from the amblyopia

IV.—Operative Asepsis; Instruments and Dressings, by Dr. DESPAGNET.

(See ANNALES D'OCULISTIQUE, Vol. CXIII, p. 365.)

August.

I.—Chromheteropia, by Dr. MALGAT.

Under this name the author designates a difference in the color of the two irides.

The two new cases reported confirm the statements made by the writer in June, 1889, in the *Recueil d'Ophtalmologie*. They are briefly:

Persons affected with chromheteropia have dark skin and brown hair and all present this difference in color from birth.

Heredity seems to have no influence in the production of this condition, and no diseased condition has caused chromheteropia. For a long time both eyes preserve equal vision until the day when the lighter eye presents traces of opacity in the lens capsule. The lighter eye becomes covered with a soft or semi-soft cataract at a variable age and the darker eye remains healthy and is not affected with cataract.

II.—Glaucoma and Myopia, by Dr. PUECH.

(See ANNALES D'OCULISTIQUE, Vol. CXIII, p. 352)

II.—Permanganate of Potash in Ocular Practice, by Dr. VIAN.

(See ANNALES D'OCULISTIQUE, Vol. CXIII, p. 363.)

III.—A New Achromatic and Aplanatic Lens, by Dr. GALEZOWSKI.

It enlarges sixty times and is fixed at constant distances from the corneal surface.

IV.—Operative Treatment of Strabismus; Muscular Advancement, by Dr. BOURGEOIS.

In slightly pronounced strabismus simple tenotomy is sufficient.

In the more pronounced deviations capsular advancement does not give constant results, but the same is not true of muscular advancement.

September.

I.—Skiascopic Phenomena (Shadow of a Linear Crescent and Acquired) Myopia Due to Senile Sclerosis of the Lens or a Commencing Cataract, by Dr. ANTONELLI.

As the result of the observation of a very interesting case the author suggests a simple method for the diagnosis of commencing cataract or senile sclerosis. This consists in the skiascopic investigation of the linear crescent which is displaced in a direction opposite to the movement of a plane mirror. When the sclerosis of the nucleus is advanced without constituting a true nuclear cataract, the pupil shows, on weak illumination of the pupillary field with a plane or convex mirror, a central disc 5 to 6 millimetres in diameter less luminous than the peripheral zone. This disc is very slowly displaced on the red fundus of the pupil in an opposite direction to the movements of the eye.

To observe this linear crescent skiascopy should be performed with a weak illumination, and the observed eye should be examined in quite an oblique position. This linear crescent should not be confused with the paracentral shadow due to spherical aberation. These phenomena reach a marked degree when the difference in refraction between the nucleus and the cortex of the lens is considerable

II.—Oculo-Pupillary Disturbances in a Case of Unilateral Sysingomyelia, by Dr. VIOLET.

III.—Ocular Más-age, by Dr. PARENTEAU.

(See ANNALES D'OCULISTIQUE, Vol. CXIII, p. 359.)

October.

I.—Ophthalmological Studies, by Dr. CHAUVEL. (To Follow)

II.—Cataract Operation and Method for Extraction of Cortical Masses, by Dr. CERRILEO.

The writer dispenses with the blepharostat, fixation forceps and cystitome, fixing the eye with the fingers and rupturing the capsule with the point of the knife. When lens masses remain in the eye delaying cicitrasiation and producing secondary cataract the fourth or fifth day after operation, a Beer's knife is introduced through the lower part of the cornea, about 1 millimeter from the border of the cornea, making a wound identical with that necessary for iridectomy. As the lens masses are at that time floating in the anterior chamber they are expelled with the escape of the aqueous humor, and if remnants of the capsule still remain in the posterior chamber they are readily withdrawn with fine forceps, as at that time they have formed no adhesions with the iris. This operation, performed a hundred times without complication, prevents the formation of secondary cataract.

III.—**Antipyonin and its use in Ocular Therapeutics,** by Dr. E. ROLAND.

(See ANNALES D'OCULISTIQUE, Vol. CXI, p. 443.)

November.

I.—**Coloboma of the Sheath of the Optic Nerve,** by Dr. STRZEMINSKI.

Observed in a patient forty-nine years old who was emmetropic with normal visual field and clear refractive media. There was no other anomaly of the eyes and no malformation of the head.

II.—**Ophthalmological Studies,** by Dr. CHAUVEL.

The writer has pursued statistical studies of military men from an ocular standpoint.

Visual acuity of astigmats.—Astigmatism exercises a depressive action on the visual function, even in low degrees. Its influence increases rapidly with the degree of ametropia and is considerable after 2 dioptres.

Accommodation.—It is sensibly below the normal for emmetropic subjects of the same age. It varies greatly from 2 to 12 and even 14 dioptres.

Visual field.—Has slight influence on the extent of vision.

Orientation.—Astigmatism conforms to the rule in which the more refractive meridian is most frequently vertical.

Astigmatism contrary to the rule is accompanied with a greater depression of visual power than that which conforms to the rule. This is due to the action of the lids.

Complications.—Several persons had chronic blepharitis and obstinate conjunctivitis.

Deep anatomical lesions.—Choroidal atrophy is frequent as well as vascularization of the optic disc, and these two lesions are as frequently isolated as united. Posterior staphyloma and helmet-shaped disc are common.

Muscular disturbances.—They are not related in their origin with astigmatism.

Functional convergent strabismus.—Convergent strabismus may be divided into three classes: those with good vision, $V = 1$ to $\frac{1}{2}$, 7.6 per cent.; those with moderate vision, $V = \frac{1}{3}$ to $\frac{1}{6}$, 25 per cent.; and finally those with bad vision, $V < \frac{1}{6}$, 67.4 per cent.

Two-thirds were hypermetropic and 50 per cent. astigmatic. Of 24 patients operated upon 14 had divergent strabismus and 10 convergent strabismus.

Functional divergent strabismus.—From a visual standpoint there were:

Good vision	$V = 1$ to $\frac{1}{2}$,	2.8 per cent.
Moderate vision	$V = \frac{1}{3}$ to $\frac{1}{6}$,	26.8 per cent.
Bad vision	$V < \frac{1}{6}$,	70.4 per cent.

This amblyopia, as well as that in convergent strabismus, could not be attributed to the statical condition of refraction as the use of a stenopeic opening gave:

Good vision	$V = 1$ to $\frac{1}{2}$,	7.6 per cent,
Moderate vision	$V = \frac{1}{3}$ to $\frac{1}{6}$,	38.1 per cent.
Bad vision	$V < \frac{1}{6}$,	54.3 per cent.

Of 102 cases examined for the statical refraction there were 41 emmetropes, that is 40.1 per cent., 41 hypermetropes, 40.1 per cent. and 20 myopes, 19.8 per cent. These figures are contrary to the classical data.

Two-thirds had regular astigmatism.

Nystagmus.—Dividing them into three classes we have:

Good vision	$V = 1$ to $\frac{1}{2}$,	16.2 per cent.
Moderate vision	$V = \frac{1}{3}$ to $\frac{1}{6}$,	40.5 per cent.
Bad vision	$V > \frac{1}{6}$,	43.3 per cent.

The visual field was contracted in 33 out of 100 cases.

Paresis and paralysis of ocular muscles.—1st. *Muscular asthenopia. Insufficiency of the internal recti.* Nearly all had more or less pronounced anaemia.

2d. *Paresis and paralysis of the external oculo-motor.*—Of 10 patients submitted to specific treatment (mercury in the dose of 4 to 6 grammes, and iodide of potassium starting commonly with 4 grammes daily, and increasing rapidly to 8, 10 and 12 grammes), there were 2 recoveries, 4 improvements and 4 failures.

3d. *Paresis and paralysis of the common oculo-motor.*—Of 22 patients submitted to mixed treatment, 13 derived no benefit, and 9 showed more or less marked improvement. There was not a single case of complete and permanent recovery.

In these cases the paralysis affected especially the territory of the third pair of cranial nerves, but losses of contractility were observed limited to one of the muscles supplied by the common oculo-motor; for example, isolated paralysis of the left internal rectus, as the result of a fall from a bicycle, paralysis of the inferior rectus (one case dependent on syphilis, and two on a traumatism), and an isolated paralysis of the superior rectus, resulting from a fall on the head. This latter patient also had atrophy of the optic nerve. He became blind, and died a short time afterwards.

Paresis and paralysis of the pathetic nerve.—Four cases, one due to cold, two to syphilis (mixed treatment failed in one case, but was favorable in the other), and one to any injury. In the latter case there was old syphilis; by the daily use of 10 to 12 grammes of iodide, stimulating inunctions, electricity and strychnine, complete recovery was brought about.

Accommodative asthenopia.—This is not frequent in the army. A convex spherical lens should be employed for near vision and general tonic treatment.

Mydriasis.—From the etiological standpoint, syphilis was found in 7 cases, locomotor ataxia in 2, scarletina in 1, cerebral softening in 1, and traumatism in 6.

Affections of the lids. Blepharospasm.—Seven cases; only two recovered after section of the supra-orbital nerves. In still another, recurrence followed shortly after surgical intervention, which had at first appeared successful. *Contused wounds:* two cases. *Burn:* resulting from cigar ashes. *Acute œdema:* cause unknown. *Ulcer:* three cases. *Syphilitic chancre:* one case without ocular lesions. *Ectropion:* five cases. *Lagophthalmus:* resulting from a carbuncle. *Symblepharon:* three cases, one the result of old granular conjunctivitis, and the other two of injury. *Serious cysts.*—*Chalazion:* Simple incision, with expression of the contents of the cyst, and cauterization with nitrate of silver proved successful in some cases, but was not always sufficient, and exposed the conjunctival sac to inflammation. Extirpation should therefore have the preference. Some disappeared spontaneously as the result of careful applications of tincture of iodine on the cutaneous surface.

Affections of the orbit and the brow.—1st. *Wounds and injuries:* Uncommon. 2d. *Traumatic amblyopia:* two cases. 3d. *Supra-orbital neuralgia:* In one case which had persisted for several years, stretching the nasal nerve was performed with great improvement. 4th. *Periostitis of the internal orbital wall:* Was cured, in spite of the patient's denial, by iodide of potassium and mercurial ointment. 5th. *Orbital tumor:* a single case. 6th. *Hydatid cyst of the orbit:* Observed in one case. 7th. *Tumor of the brow:* Fibroma, which developed in cicitricial tissue. 8th. *Epithelioma:* In one patient with epithelioma, which had invaded the bulbar conjunctiva and partially destroyed the eye, exenteration of the orbit was performed, but there was a recurrence in the fundus of the orbit even after complete cicitrazition of the operative wound, and the patient, exhausted by hemorrhages and suppuration, died just as the neoplasm had reached the brain, and was about to give rise to meningitic symptoms.

III.—**Ophthalmological Terms,** by Dr DRACOULIDÈS.

From linguistic study, the writer would replace the term *emmetrope* by *kalliops*, *emmetropia* by *kalliopsia*, *hypermetrope* by *teleops*, and *hypermetropia* by *teleopsia*, *ametrope* by *kakiops*, and *ametropia* by *kakiopsia*, *astigmat* by *polystigmat*, and *astigmatism* by *polystigmia*, *anisometrope* by *anisops*, and *anisometropia* by *anisopsia*, *myope* by *myops*, retaining the term *myopia*.

IV.—**Specific Pigment Chorio-Retinitis in Course of Recovery from Treatment with Mercurial Inunctions,** by Dr. HOUDART.

This treatment has been followed for several consecutive years, with great regularity. The patient, thirty-five years old, has normal vision in the left eye, and with the right reads the entire scale at a distance of 3 metres, with 3.50 D. The visual field, greater in the left than in the right, has increased for several months.

December.

I.—**A New Operation for Trichiasis with Entropion,** by Dr. TRANTAS.

After inverting the upper lid, the conjunctiva and tarsus are incised 3 millimetres below the palpebral border. The incision is internal. With a fine Reverdin needle, four or five sutures are introduced from the ciliary portion of the lid to the tarsus, which is pierced in the upper portion. The sutures are then tied internally.

II.—**Clinical Observations,** by Dr. GALEZOWSKI.

Traumatic iritis giving rise to syphilitic irido-choroiditis.—By the application of two leeches to the temple, alternate instillation of atropine and eserine and general anti-syphilitic treatment, the disease was completely arrested after the third week of treatment.

Iritis, with posterior synechia in a child; choroidal exudations; hereditary syphilis.—With constitutional and mercurial treatment, consisting of 0.25 grains of double mercurial ointment in repeated inunctions every five days, the disease was arrested in a child eight months old.

Iritis, with punctate keratitis and choroiditis; vascularization of the iris.—With mercurial inunctions prolonged for more than six months, the cornea cleared up, the iris lost its dark color, and the vascularization of the iris completely disappeared.

BOOK NOTICES.

BOOKS AND THESES.

Essay upon the Application of Orrotheraphy to the Treatment of Conjunctival, by Dr. AUBINEAU (*Paris Thesis*, June, 1895.)

The triumphs of anti-diphtheritic serum in ocular diphtheria day by day become more numerous. Dr. Aubineau makes an important contribution of his personal observations. Let us say at once that in his ten observations, cure was obtained in seven in two or three days by injections of 10–20 c.c. of Roux's serum. We note that in series cases II and III relate to two children in a family attacked by an acute contagious conjunctivitis. While the parents had only a simple acute contagious conjunctivitis, in the two children diphtheria developed. These cases are exactly analogous to some I have already noted, which show how readily diphtheria can engraft itself upon a preëxisting affection.

In case V, which is that of a four years old child suffering with an impetigenous eruption on his face, corneal lesions, and a conjunctival false membrane, the affliction was but little influenced by the serum injection. Was it true ocular diphtheria? Although the author tells us that an examination made in the beginning showed short Loeffler bacilli, we are much inclined to think that the conjunctival and corneal lesions were of the same nature as the impetigenous affection of the face. We accept with some hesitation case VII which is that of a newly born infant suffering from conjunctivis and treated by silver nitrate (collygium or pencil?). Finally in case IX there was no false membrane and the conjunctival affection accompanied by corneal lesions was not influenced by the serum. The diagnosis was based upon a culture which gave three days after the inoculation of the tubes, colonies of Loeffler bacilli. If we admit some doubts as to the diphtheritic nature of the lesions in these cases, it is because the diagnosis by culture was not confirmed by inoculation, and because the colonies considered diphtheritic appeared only thirty-six hours or more after the inoculation of the media. Moreover in no case, was a microscopic examination of the conjunctival exudate made. There exists upon almost all conjunctivæ a small bacillus which give upon serum colonies quite identical in appearance with that of the diphtheria bacillus, only their development is less rapid. This bacillus is absolutely harmless, even in enormous doses, and we would commit a grave error, if we considered as ocular diphtheria all cases in which culture upon coagulated serum showed its presence.

Following the serum injections, Dr. Aubineau has thrice observed the appearance of an evythematous eruption, from five days to a month after injection. Apart from this slight accident, he has seen no complication due to the serum.—V. MODOX.

Therapeutics of the Eye, by DR. OHLMANN. (*Wiesbaden F. Begfman*, 1896.)

Dr. Ohlmann has been able to make something better than a mere catalogue of diseases and remedies out of his epitome of ocular therapeutics.

The work shows accurate and comprehensive views of general pathology as well as of the pathology of the eye. To those who wish to systematize their knowledge on this subject, the work of Dr. Ohlmann will render valuable service, as an epitome that is both clear and complete.—S.

An Atlas Manual of Ophthalmoscopy, by M. O. HAAR, Edition Francaise by A. TERSON and A. CUINOD (64 chromo lithographs and 13 figures in the text, *Paris Battière*, 1895.)

The book is remarkable both for illustrations and text. The cases of which opthalmosçopic views are given have been very happily chosen and the execution of the views is perfect, recalling by their fidelity the beautiful plates of Ed. Jager. The text is very condensed but contains a complete treatise on ophthalmoscopy and an essay upon opthalmoscopic lesions in general diseases. These two accessory parts form a valuable supplement and render the book of service in general medicine. The price, 12 francs, is very moderate for a book containing 64 chromo lithographs.—S.

MEDICAL JOURNALS.

The Question of the Efficacy of Sub-Conjunctival Injections of Sublimate in the Therapeutic of the Eye, DR. STEDMAN BULL (*New York Med. Jour.* January 19, 1895).

During the year 1894 the author applied the Method of Darier in 41 cases. He employed a solution of 1-1000, and the dose injected each time was a twentieth of a milligramme of sublimate, according to the practice of the originator.

Stedman Bull is well known for the frankness and scientific accuracy with which he gives the results of his clinical investigations.

We give a synopsis of his article with all the more pleasure, becau it deals with a therapeutic method that has enthusiastic advocates, well as determined and earnest opponents.

Six cases of parenchymatous keratitis, four of which were unilate and two bilateral. The youngest patient was nine years, the old eighty-two. Of the eight eyes three were affected with the vascu form. All the cases were chronic and had resisted the ordina remedies previously employed. The number of injections varied fr three to ten in a week. In three of the eight eyes treated, after t first injection, a violent reaction set in and subsided only after fr four to eight days. But this reaction did not follow the subseque injections, and in the other five eyes did not occur at all. In all t pain caused by the injections was very severe and continued for so hours, despite the free use of cocaine.

In none of the eight eyes treated was there the least amelioratio possibly owing to the severity of the symptoms, possibly from t duration of the affection. On the other hand there was no aggrav tion of the symptoms. The cases were not affected in any way a he returned with advantage to the usual treatment (Atropine, w compresses, leeches to the temple, syrup of the iodide of iron and c liver oil).

Eight Cases of Corneal Abscess with Hypopyon.—All of traumat origin. In three cases active reaction after injection, slight reacti in the other five.

In no case was the eye lost, but on the other hand in no case w there any tendency whatever to a diminution of the severity of t symptoms or the duration of the disease. The pain excited by t injections was intense; in three cases the reaction was so pronounc as to suggest for a time the development of an orbital phlegmon.

Two cases terminated in a partial erosion of the cornea. The othe recovered with more or less adequate vision, under the influence the later use of atropine, sublimate 1-5000, the galvano-coutery a compression bandage.

Two Cases of Scleritis and Episcleritis in Syphilitic Subjects.—Pain a reaction violent. But here the injections accomplished wonders. one case the symptoms disappeared after the first, in the other aft the third injection.

Ten Cases of Iritis also Syphilitic.—Plactic form. Reaction modera in six cases, violent in four In these latter the reaction was so i tense that the author thought it prudent not to repeat the injection In no case was recovery any more rapid than with ordinar

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measures, and it was certainly retarded in the four where the reaction was so pronounced.

Fifteen Cases of Irido-Choroiditis.—Eleven were of syphilitic origin, the other four, in all probability, non-syphilitic. The eleven syphilitic cases were chronic and presented only an insignificant exudate into the aqueous and vitreous humors. The other four were acute with severe pain and considerable infiltration of the vitreous. In one of the syphilitic cases, where there was no reaction, the injection had a favorable influence upon the progress of the disease. In all the others, where the injection was followed by rather active reaction, the result was absolutely nil. Moreover the injections were made frequently, up to ten in one case. In the other four non-syphilitic cases very distinct success was obtained in three. Pain violent, reaction slight.

Three Cases of Orbital Phlegmon of Traumatic Origin.—The injections were made into the inflamed tissues. Little reaction. Cure with recovery of sight in two cases, with slight perception of light in the third. The injections did not seem to influence the ordinary course of the disease. Deep incisions into the orbital tissues ought to be employed.

Two Cases of Sympathetic Ophthalmia.—The injections were made into both eyes. Marked aggravation of the symptoms. Intense pain and violent reaction. In both cases the sympathetic ophthalmia, which complicated relatively recent traumatisms, was well advanced and, for this reason, could be but little affected by treatment. But at any rate the author does not feel encouraged to employ this method in cases of this nature.

Two Cases of Syphilitic Neuro-Retinitis.—He made seven injections at intervals of from five to six days. The results were excellent, but not better than from the treatment usually employed.

The author concludes :

1. Pain is always severe, despite the use of cocaine.

2. The reaction may be active, and is sometimes of extreme severity.

3. The only classes of affections in which the subconjunctival injections of sublimate seemed to have a favorable influence, either upon the intensity of the symptoms or upon their duration, were those of syphilitic scleritis and those of non-specific irido-choroiditis.

4. The method of sub-conjunctival injections is still sub judice, and ought not to be indiscriminately employed. Only the careful observation of a large number of cases can determine its merits. The pain

and reaction which the injection can entail do not occur with any ordinary remedy.—VAN DEN BERGH.

A Suggestion Apropos the Treatment of Penetrating Wounds of the Ciliary Region and the Crystalline Lens, by Dr. RANDOLPH (*New York Medical Journal*, February 23, 1895.)

Apropos of two cases in which he has had to be content with the extraction of an injured lens, the author speaks of the frequency with which fear of sympathetic ophthalmia leads to the needless sacrifice of an eye. In these cases the lens of the injured eye become opaque and swell up. It then plays the part of a foreign body, and is an effective cause of sympathetic irritation. Instead of enucleation in such cases, Randolph advises the extraction of the lens.

His observations are too few and too recent for him to venture to say that by this means one can surely prevent a sympathetic ophthalmia. But he suggests the trial of this plan to his confrères, while recommending enucleation at the first sign of danger.—VAN DEN B.

On the Disadvantages of Monocular Vision, by Surgeon-Major WHITEHEAD (*The Lancet*, July 13, 1895.)

The author looks at the question altogether from the military standpoint The visual field instead of comprising the whole horizon is limited by the nose, which takes away an angular value of about 47°. Moreover, it is more difficult to determine the situation of objects.

Vision, rapidity of motion of the eye and promptness in distinguishing color are diminished.

In passing the author notes the difficulty in aiming with the left eye, in case the right is lost; and the discomfort of the catarrh of the conjunctival sac, which is so frequent when enucleation has been done.—VAN DEN B.

A Case of Sarcoma of the Orbit in a Child, by Mr. BEAUMONT. (*The Lancet*, September 21, 1895.)

A girl, of six years, came to consult the author on September 17, 1893, for a reddish colored induration of the conjunctiva of one month's standing.

The tumor was situated in the internal commissure of the right ey and had the appearance of a small cockscomb, protruding through th cleft of the eyelids. It seemed to be superficial and was easily remove Under the microscope it showed the structure of a simple polyp, wi blood vessels of small calibre and cells embedded in a matrix of co junctival tissue. The tumor was considered benign and the ch returned home. Six months later (April 2, 1894) she returned w a recurrence of the tumor which had this time invaded the upper lid. It was removed under chloroform. The internal half of the tarsal cartilage was sacrificed. Globe sound. A second microscopic examination of the tumor showed the suspected evidences of malignancy. Meanwhile the wound healed readily and the patient again left the clinic. On the following third of June, a new recurrence, with invasion of the whole orbit and exophthalmia. Increase of pain. Globe sound. Enucleation and evisceration. Under the microscope, a round-celled sarcoma. Later recurrence and death, September 23, 1894. The author's case is an example of those tumors having all the appearances of benignity which suddenly take on a malignant character after operative interference, "véritables noli me tangere."—VAN DEN B.

On the Cause of Corneal Pits following Section of the Trigeminus, by Dr. HANAN. (*Corresp. Bl. f. Schw. Aerzte*, September 1895.)

These pits do not form when the cornea of the newly-born animal is protected by the closure of the eyelids according to Gudden. On the other hand, they are observed without lesion of the trigeminus. When having fixed the eyelids, one blows upon the cornea, so as to dry the surface. This phenomenon is therefore not due to a lesion of the garglion cells, but simply to drying. Hanan asserts also that the neuroparalytic keratitis does not develop as long as the protective occlusion, according to Gudden, is maintained. But as soon as the palpebral cleft is restored by operation, the keratitis develops, even a year after the section of the trigeminus.

The corneal pits are also observed in the profound narcosis of the moribund, and when the eye is blown upon after section of the facial.—G. H.

Exostosis of the Orbit, by Dr. GALLEMAERTZ. (*La Policlinique de Bruxelles*, November 15.)

He reports a patient, operated upon at two different times for an intraorbital osseous tumor which had its origin in the part of the root corresponding to the frontal sinus. The second operation completed the results obtained from the first, for all external evidence of the exostosis disappeared and the exorbitus did not return. Although the extirpation could not be completed the second time, and the operation consisted in forming with the gouge and mallet a new orbital vault and making a cavity which would permit the eye to resume its proper position. The patient who was photographed seventeen months after the operation is doing well.

This case shows that even when the tumor cannot be completely extirpated, the operation is indicated to allow the eye to resume its place and remove the pressure on the optic nerve. It may moreover, that medical treatment has no effect.—V.

Some Rare Affections of the Eye, by Dr. DEHNIG (Wurzburg). (*Münc Wochenschrift*, 1895, Nos. 34, 35, 36.)

· Dehnig contributes a series of observations of rare cases: others a double paralysis of the sixth nerve occurring in a chi years, three weeks after a severe diphtheria, and some days be appearance of paralysis of the limbs or the palate. The ciliary and the sphincter pupillæ were found normal. Recovery w plete in six weeks. The author dwells upon the characteristic of post-diphtheritic ocular paralysis; the most frequent is accommodation (about 8 per cent. of all cases of diphtheria); the sis of the sphincter pupillæ is much more rare. The other b of the third and the fourth are never found to be the seat of po theritic paralysis, while the post-diphtheritic paralysis of th rare to be sure, is still well established. The observations t published show that it is a sequel of severe diphtheria and t prognosis is the same as that of accommodation; it recovers sp ously in one or two months. The post-diphtheritic paralysis sixth nerve is always a sequel of severe diphtheria. Hochha choso's Archives, CXXIV, p. 230) has had opportunity to n examination of the right externus of a patient dead from a po theritic paralysis of the heart. He found a well-marked int inflammation of the muscular fibres as well as a slight interst flammation of the sixth nerve.—S.

Treatment of Ophthalmia Neonatorum by the Oxycya Mercury, by Dr. VON SICHERER (Wurzburg). (*Munch: Med. W* 1895, No. 49.)

Von Sicherer recommends cleansing the everted eyelid, in c mia neonatorum, with a solution of the oxycyanide of me least once a day. In the interval he makes constant applic iced compresses. The author attributes the introduction of th septic into ophthalmology to Schloesser (1893). .Some time that date this salt of mercury was studied, employed and mended by Dr. Chibret (of Clermont-Ferraud).—S.

A New Theory of Color Perception, by Dr. EBBINGHAUS (Z Psych. u. Phys. d. Sinnesorgan. T. V., p. 145-238.)

The author assumes the existence of three substances serv the perception of light, and situated in the external stoata retina. The first is distributed over the whole retina, and se the perception of white or gray; it is sensitive to all wave le the visible spectrum, but especially to average lengths. A second substance contained in the external substance of the rods and cones, identical with the visual purple, absorbs especially the red, yellow, and green rays. A third substance, found only in the external substance of the cones, which is tinted with a green complimentary to purple, and which makes the external substance of the cones appear white, is sensitive to the extreme rays of the visible spectrum. Each of these substances is capable of a double decomposition under the successive action of two classes of rays, to which it is sensitive. The second substance serves for the perception of both yellow and blue, the third for that of red and green. The ordinary cases of color-blindness do not possess the third substance; the two great classes which they present can be explained by two modifications of the retinal purple. Complete color-blindness is explained by the absence of both chromatic substances, or by anomalies of nerve conduction.—S.

Further Contributions to the Bacteriology of Purulent Keratitis in Man, by Dr. UHLHOFF. (*Berl. Klin. Wochensch*, 1895, p. 104.)

The fifty cases of suppuration of the cornea submitted to bacteriological examination by Uhlhoff comprised thirty-five typical ulcerations of the cornea, ten cases of keratitis with hypopyon without serpiginous characters, three cases of keratomolacia and two of Panophthamia.

In twenty-four cases of the first category and in the two cases of Panophthalmia, the diplococeus of Talamon-Fraenkel was found in pure culture, while in seven other cases it was found with less virulent micro-organisms (xero-bacilli and stophylococci). In thirteen cases the presence of the pneumococcus could not be established, but the author thinks that a defective condition of the culture medium was responsible for this apparent absence.

The three cases of kerotomolacia were characterized by the presence of the streptococcus. In the other cases he found some staphylococci (4), and a filiform bacterium, the cultures of which quickly developed a mucous degeneration, the bacillus hyogenes fœtidus (1).

In four cases which had continued for some time, the result of the bacteriological examination was negative. The pus of hypopyon was found sterile without exception, when the examination was made before perforation of the cornea.

In the many cases examined of dendriform, phlyctenular, superficial and parenchymatous keratitis, trachomatous pannus and rodent ulcers, the pneumococcus was never met with, but this micro-organism often occurs in the conjunctiva of normal eyes; in some cases of conjunctivitis, of the character described by Parinaud and Morax, it was the pathogenic agent. The typical cases of ulcus corneal serpens were complicated by lachrymal tumors in 38 per cent., and with ozæna in the proportion of 21 per cent., and the pathogenic microbes of the cornea were found also in the lachrymal canals, the nose and the mouth.—S.

The Role of the Facial in Lachrymal Secretion, by Dr. Triboudeau. (*Journal de Medicini de Bordeaux*, No. 44, November 3, 1895.)

Goldzicher observed that in patients suffering from a complete facial paralysis from a lesion above or at the geniculate ganglion, and marked by a paralysis of the soft palate, there was always an abolition of the secretion of tears. He inferred that the secretory fibres of the gland come from the facial, follow the great superficial petrosal nerve, pass from the sphenopolative ganglion to the temporo-maxillary nerve, and thence to the lachrymal. Tepliachine has endeavored to work out experimentally this hypothesis of Goldzicher, but he was unable to secure an increased lachrymal secretion, whatever the excitation of the facial; still his experiments lacked precision.

Triboudeau has answered the question by cutting the facial, together with the auditory and pars intermedia of Wrisberg at the internal ear. Two dogs operated upon in this way have shown all the symptoms of complete facial paralysis, together with permanent nystagmus, loss of equilibrium, inclination of the head from the operated side, and deafness, signs of lesions of the internal ear and auditory nerve. To a hasty examination the lachrymal secretion appeared increased during the first days, but this was due to the imperfect action of the tear ducts. Three weeks after the operation there was a very decided difference between the two eyes; the eye of the operated side was simply humid, while that of the opposite side had some liquid in the cul-de-sac. Excitation of the conjunctiva by a Faradic current determined an increase of the lachrymal secretion on the sound side, but not on the other.

Histological study of the lachrymal nerve showed the presence of many fibres in process of Wallerian degeneration. The author concluded that the facial, a purely motor nerve, a purely centrifugal at the point of section, is the only channel by which nerve influence comes to the gland after reflexion or elaboration at the centers.

Among men the nerve influence which excites the secretion of tears is most often the result of a special cerebral activity; the intellectual state which we call sorrow reflects itself upon the secretory and motor fibres of the facial. But very often the flow of tears is due to a reflex action and the paths which an impulse can follow to reach the reflex centers are multiple; the centrifugal path is single to the facial nerve. If the facial is injured, no disturbance of the cerebral cells, no irritation of sensitive nerves can induce a secretion of tears, for the centrifugal pathway is destroyed. The reflex is no longer possible, the secretion cannot be influenced. But it cannot be said that it does not exist, for it still flows sluggishly, without control. The similar action of the chorda tympani is no longer questioned, but after secretion of this nerve the saliva still continues to flow slowly through the secretory channels.—V.M.

V.—MISCELLANY.

ITEMS.

Medical Faculty of Greifswald.—Dr. Otto Schirmer, professor extraordinary, has been appointed professor of ophthalmology, replacing Dr. Fredr. Rud. Schirmer, deceased.

ANNALES D'OCULISTIQUE

Volume CXV.—Number 5.

May, 1896.

I.—ORIGINAL CONTRIBUTIONS.

MEMOIRS

RAPID EXAMINATION OF VISION BEFORE THE COUNCIL OF REVISION.

By Dr. **L. DE SANTI,**

Méddécin-Major of the 1st Class, to the 2d *Torailleurs algériens*.

I. Conditions of Availability for the French Military Service.—According to the terms of Articles 85 and 86 of the Ministerial Instructions of March 17, 1890, concerning the physical fitness for military service, exemption was stated on the ground of:

1. Diminution of visual acuity of more than $\frac{1}{2}$ for one eye and of $\frac{1}{10}$ for the other, whatever may be the reason for this diminution (ametropia alteration of the transparency of the media, lesions at the fundus of the eye or amblyopia *sine materia*);

2. Reduction of the temporal visual field of more than half, that is to say, of 45°, whatever may be the cause of such reduction;

3. Myopia exceeding 4 D;

4. Myopia less than 4 D, but accompanied by extensive and deep choroidal changes, indicating progressive myopia;

5. Myopia less than 4 D, but accompanied by pronounced mus-

cular asthenopia or divergent strabismus with diminution of visual acuity.[1]

Every other condition classified the subject examined as fit for active service.

These data have just been considerably modified by the new instructions of March 13, 1894, which not only extend the limit of the degree of myopia compatible with the active service, introduce again into the classification of cases the idea of the auxiliary service.

In consequence, and in the terms of Articles 85, 86 and 87 of these instructions, there is no longer any actual cause of exemption except:

1. The diminution of visual acuity below ¼ for one of the eyes and $\frac{1}{10}$ for the other, whatever may be the cause of this diminution (ametropia, alteration of the transparency of the media, lesions of membranes or amblyopia *sine materia*);

2. Myopia exceeding 6 D, when this myopia is accompanied with extended choroidal lesions;

(The investigation of binocular vision is unnecessary, because the acuity of binocular vision is obviously equal to the visual acuity of the eye which has the better sight.)

In compensation, the following cases are classified in the *auxiliary service:*

3. Diminution of visual acuity from ½ to ¼ for one of the eyes, provided the visual acuity of the other eye remains greater than $\frac{1}{10}$.

4. Myopia equal to or less than 6 D., provided the visual acuity be greater than ¼ for one of the eyes and $\frac{1}{10}$ for the other.

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[1] The instruction says: "Diminution of visual acuity in the prescribed limits;" the limits prescribed being ½ for one of the eyes and 1-10 for the other. Does that imply that, in order that slight myopia with muscular asthenopia or strabismus divergens should justify exemption, it should be accompanied by an amblyopia of ½ for one eye and 1-10 for the other? Evidently not, since the preceding paragraph says that: "Every vice and every lesion of the organs of sight which reduces the visual acuity under ½ for one of the eyes and 1-10 for the other is a cause of exemption." The sole fact of this reduction of acuity, then, would have caused exemption without considering the vice of refraction.

The interpretation to be given to Article 86, then, is that *any myopia with pronounced muscular asthenopia or external strabismus and with diminution of visual acuity* (*even less than ½ for one eye and 1-10 for the other*) *is a cause of exemption.* In reading § 86, then, the words, "within the forecited limits," may be suppressed.

5. Myopia exceeding 6 D., provided the visual acuity exceed $\frac{1}{4}$ for one of the eyes and $\frac{1}{10}$ for the other, and there be no extended choroidal lesions.

Every other condition classifies the subject examined in the active service.

Now, it would seem, according to the last five propositions stated that any even slight myopia without diminution of visual acuity should be adjudged amenable to the auxiliary service (Art. 86, paragraph 3) ; but this corollary is too absolute. Indeed on the one hand, Art. 86 does not say that any myopia, less than 6D., but accompanied with good visual acuity, ought to be placed in the auxiliary service ; it says only that such myopia "is compatible with the auxiliary service." On the other hand, paragraph 1 of Art. 85, stating that a visual acuity of at least $\frac{1}{2}$ for one eye and $\frac{1}{10}$ for the other is necessary to fitness for the active service, makes no restriction concerning the condition of ocular refraction. Consequently we may conclude that weak myopia, that is to say myopia of less than 2D., and without diminution of visual acuity is compatible with the active service.

Such is the total of the data relative to sight which the physician, in the examining board, must always have in mind. *A priori* the problem appears complex, especially since it must be solved by a rapid operation. It is also indispensable, in order to arrive promptly at a correct solution, to employ, as is done in mathematical problems, those methodical processes of analysis, which, by arranging the terms of the problem in stages, lead without confusion to the result.

II. METHODS OF EXAMINATION.—A multitude of methodical processes have been suggested for the examination of sight. I will cite in particular that of the *stenopaic disc and weak spherical glasses* suggested by Dr. Chauvel[1].

This process consists in placing the man to be examined at a distance of 5 metres from a brilliantly lighted typographic scale, and taking the acuity of each eye successively without correction[2].

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[1] Chauvel. Precio de l'examen de l'oeil, 1883, p. 46.

[2] Art. 85, paragraph 4 of the instructions of March 13, 1894, prescribes equally the investigation of visual acuity at a distance of 5 metres ; but in practice a distance of 3 metres may suffice, provided one has a scale proportionate, for example, de Wecker's scale.

cular asthenopia or divergent strabismus with diminution of visual acuity.[1]

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These data have just been considerably modified by the new instructions of March 13, 1894, which not only extend the limit of the degree of myopia compatible with the active service, introduce again into the classification of cases the idea of the auxiliary service.

In consequence, and in the terms of Articles 85, 86 and 87 of these instructions, there is no longer any actual cause of exemption except:

1. The diminution of visual acuity below ¼ for one of the eyes and $\frac{1}{10}$ for the other, whatever may be the cause of this diminution (ametropia, alteration of the transparency of the media, lesions of membranes or amblyopia *sine materia*);

2. Myopia exceeding 6 D, when this myopia is accompanied with extended choroidal lesions;

(The investigation of binocular vision is unnecessary, because the acuity of binocular vision is obviously equal to the visual acuity of the eye which has the better sight.)

In compensation, the following cases are classified in the *auxiliary service*:

3. Diminution of visual acuity from ½ to ¼ for one of the eyes, provided the visual acuity of the other eye remains greater than $\frac{1}{10}$.

4. Myopia equal to or less than 6 D., provided the visual acuity be greater than ¼ for one of the eyes and $\frac{1}{10}$ for the other.

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Every other condition classifies the subject examined in the active service.

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Such is the total of the data relative to sight which the physician, in the examining board, must always have in mind. *A priori* the problem appears complex, especially since it must be solved by a rapid operation. It is also indispensable, in order to arrive promptly at a correct solution, to employ, as is done in mathematical problems, those methodical processes of analysis, which, by arranging the terms of the problem in stages, lead without confusion to the result.

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Let us suppose this acuity to be $\frac{1}{10}$ for both eyes.

If now an opaque diaphragm pierced with a very small opening (for instance, a visiting card with a pinhole through it) be placed before the eye of the subject, at a distance of from ten to twelve millimetres from the cornea, this artifice, by eliminating the marginal rays and diminishing the extent of the circles of diffusion, results in the disappearance of the causes of amblyopia depending on a defect of ocular refraction. Two cases are thus presented :

1. Either the visual acuity is not increased (in which case it is usually weakened; sometimes it remains stationary). This means that the amblyopia is independent of any defect of refraction, and that it depends either on an imperfection in the transparency of the media, or on a lesion of the *fundus* of the eye.
2. Or the acuity is increased, for example, it rises from $\frac{1}{0}$ to $\frac{1}{3}$. This means that the amblyopia is the result of ametropia.

In the first case the visual acuity is already known ($\frac{1}{10}$) ; it only remains to examine the eye by oblique illumination and direct illumination in order to make the diagnosis of the lesion.

In the second case, without changing the position of the subject, a weak concave glass, of 1 D, for example, is put before his eye, in place of the stenopaic disc. If this glass increases the sight, it is a case of *myopia*. It only remains to take his visual acuity nearer (that is to say, within the limits of his field of accommodation) and to measure the degree of his ametropia.

If, on the contrary, the weak concave glass obscures the sight, instead of increasing it, a weak convex glass of 1 D is substituted for it. If this glass increases the vision, it is a case of *hypermetropia*. The visual acuity is already known and it only remains to measure the degree of the ametropia.

Finally, if the vision is not increased by spherical glasses, it is a case of *astigmatism*. If cylindrical glasses increase the vision, the astigmatism is regular ; if they do not increase it, it is irregular.

As may be seen, one arrives easily enough, working by thes
dichotomies, at fixing the diagnosis. Unfortunately, this proce
is a little long and delicate ; it demands an intelligent subj
and a rather complex apparatus ; and above all it has the inco

venience of being entirely subjective. Now, subjective processes completely presuppose the good faith and the intelligence of the subject, which is not always the case before examining boards; and here lies the principal reason which has caused the abandonment in practice, for measuring ametropia, of *optometers* (excellent nevertheless for myopia) and of the *optometric disc.*

It is, in effect, in the diagnosis and measurement of ametropia, that the most arduous task of the physician is comprised; and all the efforts of ophthalmologists, and more especially of army physicians, have been turned, during the last few years, to the study of those processes of determining ametropia, called *objectives*, that is to say, those which do not necessitate the psychic participation of the subject examined.

III. OBJECTIVE MEASURE OF AMETROPIA.—It would be, in fact, impossible to create purely objective processes, for in what concerns visual acuity, the methods of examination can, up to the present time, at least, only be subjective; but the endeavor has been to introduce in the processes only the minimum of subjective tests and, in whatever concerns refraction, we have arrived at analysis and measurements by tests entirely objective.

These tests, based on the direct illumination of the fundus of the eye, are, as is known, two in number: the *examination of the image of the fundus*, which is sometimes improperly called the *process of the erect image*, and *keratoscopy* or *skiascopy*.

1. *Examination with the mirror by the image of the fundus.*—The examination of the image of the fundus is an old method, which allows at once the diagnosis and the measurement of ametropia. It is based on the fact that the retina being at the focus of the ocular optic apparatus, the luminous rays leaving this point are projected in that direction which they must have in order to form their focus upon the retina. This is the law of conjugate foci.

It suffices, then, that the retina of the subject to be examined be illuminated powerfully, with the help of a mirror, for the image of that retina to be exteriorized, and consequently gathered and perceived by the eye of the observer.

If the eye examined is emmetropic, the luminous rays leaving its retina are exteriorized in pefect parallelism, and consequently

and the image, consequently, should not be sharply defin
as the accommodation of the observer (and even involunta
of the observed), intervenes powerfully, it bring the di
rays back to parallelism, and allows the observer to perc
in the preceding case, a virtual, erect and enlarged imag
eye observed. This image appears situated a little beh
retina, and is large in proportion as the hypermetropia i
which is easily explained by calculation.

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leaving the retina are exteriorized in convergence and fo
focus in front of the eye observed at a distance whic
according to the degree of myopia, and which is exac
of the focal length, or of the *punctum remotum* of that ey
image is real, inverted, small, very sharply defined, and
of the observer perceives it directly.

Now, two cases may present themselves : either the m
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observed; or the myopia is weak, in which case the i
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The observer being able to perceive this image with sh
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from the eye observed by a distance equal to the focal l

observer armed with the mirror is obliged to be further and further away, the fundus of the eye ceases at a given moment to be illuminated. There is, then, a limit beyond which the myopia of the eye observed ceases to be perceptible.

This limit is easily determined. In fact, the extent of illumination of the fundus oculi does not much exceed 70 centimetres for concave mirrors (about double their focal length) and one metre for plane mirrors. If to the maximum distance of one metre is added the length of the *punctum proximum* of the observer, say 15 to 20 centimetres, we obtain, as limit of visibility for the inverted image of a myopic eye, a distance of 0 m. 75 centim. to 1 metre, which corresponds to the focal length of an eye with myopia of 1 dioptre and a half to 1 dioptre (20 to 36 inches).

By direct illumination with the mirror, then, a clean inverted image of the eye examined will be obtained only if the myopic of that eye equals or exceeds 1 dioptre.

It is on these data and on the characteristics of the image that all objective processes for the diagnosis and measurement of ametropia are based.

In effect, the inverted image is distinguished from the erect image, by being smaller, more sharply defined, and more fixed than the latter, and above all, by its essential characteristic of being displaced in the same sense as the eye observed and in a contrary sense to the eye observer. Therefore :

First Case.—If in examining an eye with the mirror and approaching it or withdrawing from it, a fragment of clean retinal image (edge of papilla, segment of retinal vessels) is perceived displacing itself inversely to the mirror, it may be immediately inferred that the case is one of myopia and of myopia exceeding 1 dioptre[1].

Second Case.—If, in examining the eye under the same conditions and preferably at a very slight distance (2 or 3 centimetres) from the eye observed, a fragment of clean but larger, quasi-transparant retinal image, which is displaced in the same sense as the mirror, is perceived, it will be concluded that the case is either emmetropia or hypermetropia.

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[1] In these manoeuvres the eye of the observer is always supposed to be emmetropic. If it is not, the observer should bring his eye to the condition of emmetropia by placing in the frame behind the mirror the glass corrective of his ametropia ; and, in every case when the emmetropic observer must place a glass behind his mirror, the ametropic observer will employ a glass representing the glass of the emmetropic observer augmented by the glass corrective of his own ametropic. Thus, if the emmetropic observer should employ a convex glass of 2 dioptres an observer with myopia of 4 dioptres must employ a glass *conv. 2 d.* + *conc. 4 d.* = *conc. 2 d.* If the observer has myopia of 2 dioptres, he must employ a glass *conv. 2.* + *conc. 2 d.* = *0*, that is to say, he will not need a glass.

The differential diagnosis of these two states is easy.

We have said that the image of the emmetropic eye is larger than that of the hypermetropic and that, in the hypermetropic eye, the image is smaller in proportion as the hypermetropia is stronger. But this characteristic is not enough, especially if the observer is not completely accustomed to the mirror, to make the diagnosis. There are happily other elements.

In fact, the perception of the erect image of an emmetropic eye exacts the relaxation of the accommodation both of the eye observed and of the eye of the observer. However little the accommodation of one of the subjects enters into action, the image ceases to be seen clearly. It results that, in order to relax completely the accommodation of observer and observed, all fixation of look must be prevented, which is secured by placing the mirror at a very short distance from the eye observed. Under these conditions the two eyes, being separated by an interval of only two or three centimetres, have no common centre for fixation and relax their accommodation. If, on the contrary, the mirror is withdrawn till it reaches the neighborhood of the *punctum proximum* of observer or observed, one of the two eyes (of the observer or observed) or even both enter into accommodation and the image disappears.

In consequence, every time an erect image is observed which is perceptible only at a distance of two or three centimetres from the eye, it is a case of emmetropia.

Every time, on the contrary, when an erect image shall be observed, which allows itself to be seen not only at a very short distance from the eye, but even at a certain distance from the eye observed, for example 10, 20 centimetres, the case will be one of hypermetropia.

But this differential character is itself difficult of perception, because the subject in cases of hypermetropia, having a very excitable accommodation, often in a state of permanent or intermittent spasm, his accommodation allows itself to be relaxed with difficulty and the image at a distance is fugitive, capricious, dancing, sometimes rebellious.

So it is well to make the differential diagnosis by the erect image of emmetropia and hypermetropia, to place in the logette of the observer's mirror a weak convex glass of one dioptre (Chauvel).

The glass confuses the image of the emmetropic eye and leaves that of the hypermetropic absolutely distinct.

Third Case.—If, finally, there is observed neither erect image near nor inverted image further away, the case will be either one of irregular astigmatism (regular astigmatism being in general a complication of myopia or of hypermetropia), or one of myopia of less than one dioptre.

The differential diagnosis of these two states is simple. For weak myopia, the image, while diminishing in intensity, tends to become more distinct in proportion as the mirror is withdrawn, while in astigmatism it suffers no change or else becomes more confused. Besides, if a concave glass of one dioptre is placed in the logette of the mirror, all uncertainty disappears, for such a glass transforms weak myopia into myopia exceeding one dioptre and consequently gives, in the case of a myopic eye, a distinct inverted image.

Thus the diagnosis of ametropic states by the mirror, offers no difficulties. It is not so with the measurement of ametropia. The exact measurement, with the mirror and with the help of the image of the *fundus oculi* of ametropia in general, can only be made with special instruments called *refracting ophthalmoscopes*.

Refracting ophthalmoscopes.—These instruments were very numerous at a certain epoch. The principal ones, or at least those best known in France, are de Wecker's, Badal's, Landolt's and Parent's, which will be found described in special treatises.

Their principle is as follows: Since the emmetropic eye in repose gives an erect and distinct image of the illuminated *fundus oculi*, it will suffice to bring the ametropic eye, by the help of the proper glass, to the condition of the emmetropia, in order that it should give the same image. Then the glass, which, placed before the ametropic eye gives the image of emmetropia, will represent the corrective glass, that is to say, the nature and degree of ametropia.

In consequence, mirrors have been constructed behind which, by a special mechanism, series or combinations of glasses, representing all the degrees of the dioptric scale, may be placed before the eye of the observer in front of the central disc of the mirror, and the nature of the ametropia being once determined, it only remains to find, by experimention, the strongest convex glass or the weakest concave glass which brings the eye back to the condition of emmetropia, that is to say, which gives an erect and distinct image of the *fundus oculi*. This glass represents the degree of hypermetropia or myopia of the eye observed.

With a little experience, one succeeds rapidly and with sufficient exactness in making these determinations. One may even, after a fashion, measure regular astigmatism by relying on the elliptical deformation of the papilla in the astigmatic and by searching experimentally for the cylindrical glass which will return to the papilla its round form. But this determination, it must of course be understood, can only be made upon an atropivised eye.

It may be seen, then, that the measurement of ametropia with refracting ophthalmoscopes is an objective process of great value and great utility to army physicians ; unfortunately it has also its inconveniences.

Of these inconveniences, some result from the very delicacy of the process which does not always permit the people experimented upon to seize themselves the exact moment when the imag ceases to be distinct. M. Chauvel admits that under this hea there is produced currently, among observers familiarized wit the process, an error of appreciation of a demi-dioptre in th measurement of ametropia.

Others result from the intervention of accommodation (whic is ordinarily the case with the ametropic, so much so that th erect image is very difficult to obtain in cases of myopia). Others finally, inherit in the process, depends on the necessity—the corrective glass not being placed at the optical centre of the ey observed but in front of this centre—that the focal length of th lens which makes the exteriorized rays parallel, should, in orde to express the exact degree of ametropia, be diminished for hypermetropia and augumented for myopia by the distance which separates the optical centre of the glass (or the eye of the observer from the eye observed) at the moment of the operation. Now, this is a notable complication of the process.

It results from this that Boards of Examiners, unless highly familiarized with the management of the refracting ophthalmoscope, ought to have recourse to some other method of objective mensuration of ametropia.

Measurement of Ametropia by the Remotum.—The best known of such methods is that called measurement by the determination of the *punctum remotum* of the eye observed. It is easy and exact in measuring myopia, difficult and untrustworthy in measuring hypermetropia.

First Case.—Measurement of Myopia.—This measurement is made by the help of the formula $D = F + p$ which we have given.

It will be remembered, in effect, that the luminous rays which leave the fundus of a myopic eye when illuminated and in repose, are exteriorized in convergence and go to form a real inverted image at the *punctum remotum* of that eye. It is a question of determining the distance that separates this image from the eye, to have the focal length of that eye, that is to say, its degree of myopia.

For this purpose the observer should know in advance what is his own *punctum proximum* (which may easily be determined by Perrin's optometre or, more simply yet, with a hair). Let us suppose this *proximum* to be 18 centimetres.

The observer, placing himself at the greatest distance at which he is able to illuminate the *fundus oculi*, say, 1 metre, distinctly perceives the inverted image of the eye observed. He then draws slowly nearer without ceasing to watch this image and he notes the exact moment at which it ceases to be distinct. This moment corresponds to the arrival of the *punctum proximum* of the observer upon the image itself.

If at this moment, then, the distance is measured which separates the eye of the observer from the eye observed, the focal length (or myopia) of the eye observed may be easily obtained by subtracting from the total distance the ***punctum proximum*** of the observer. Otherwise expressed :

$$M \text{ (myopia) or } F \text{ (focal length)} = D + p.$$

D being the distance between the two eyes and p the ***proximum*** of the observer. This is the corollary of the preceding formula, $D = F + p$.

In consequence, it will be sufficient for an emmetropic observer to find in the mirror by experiment the nearest distance at which he ceases to see distinctly the inverted image of a myopic eye, to have measured at that moment by an assistant the distance which separates his eye from the eye observed and, finally, to subtract his *proximum* from that distance, in order to have the measurement of the myopia.

This process, be it understood, applies only to myopia exceeding 1 dioptre. Nevertheless, it may be employed as well in the measurement of weak cases of myopia, on condition of placing before the eye observed, by means of a trial spectacle-frame, a convex glass of 1 or 2 dioptres, augmenting by that much the myopia of the subject, and of subtracting 1 or 2 dioptres from the number obtained by the operation.

This process is sure, easy and exact, especially if care is taken to use as result the average of two or three tests. It has but one inconvenience, that of being, by reason of its delicacy, a little long and of exacting an aid for the mensuration of the distance.

Second Case.—Measurement of hypermetropia.—The real ***punctum*** *remotum* of the hypermetropic eye does not exist, since it is, in the language of optics, *beyond the infinite ;* but the eye has a virtual *remotum* situated behind its retina. The rays that leave th virtual *remotum* will be exteriorized in divergence. If, then, th eye of the observer is myopic (and weakly so) and placed ve near the eye observed, the real *remotum* of the observer and t virtual *remotum* of the observed both finding themselves behi the retina of the eye observed, the observer will be able to reunit by means of an effort of accommodation, the exteriorized ra upon his own retina, and he will so reunite them throughout t extent of his own field of accommodation. It is indispensabl then, the observer should have a weak myopia, that is to say, *punctum remotum* sufficiently removed for the virtual ***remotum*** the eye observed to be found within the field of its accommodation (that is to say, within its real *remotum*).

If, under these conditions, the eye of the observer be withdrawn slowly from the eye observed, there will come a moment at which the *remotum* of the observer will coincide with the virtual *remotum* of the observed. At this moment the observer will still have a distinct image of the eye observed, but without any effect of accommodation.

Finally, if, continuing to withdraw, the *remotum* of the observed overpasses the virtual *remotum* of the observed, the observer will cease to see the erect image of the observed. This is the point of transition which must be seized.

At this moment, if we designate by H the degree of hypermetropia, or by F the focal length of the eye observed, by *r*, the real *remotum* of the observer (which confounds itself with the virtual *remotum* of the observed) and by D the distance between the two eyes, we obtain, as the measure of the hyermetropia, the formula :

$$H \text{ or } F = r - D.$$

Otherwise expressed, to get the hypermetropia of the eye observed, the distance which separates the two eyes at the moment of the test must be subtracted from the (artificial) *remotum* of the observer.

Then, in order to measure hypermetropia, the observer, if he is not myoyic, will give himself a weak myopia (of 1 or 2 dioptres), and, if he is myopic, will reduce his myopia to that limit by placing the proper glass in the logetti of the mirror ; he will bring himself very near the eye observed, the erect image of which he will fix ; then he will withdraw slowly, gradually (in such manner as not to solicit the accommodation of the observed), always observing that image, and, at the precise moment when the image shall cease to be distinct, he will have measured with an assistant the distance which separates his eye from the eye observed. He will only have to subtract that distance from the focal length of his eye, that is to say, from 1 metre or 0.50 m. (according as he is provided with a glass of 1 or two dioptres), to have the focal length of the eye observed.

If, for example, with an artificial myopia of 2 dioptres, the observer finds the distance between the two eyes to be 40 centimetres, the focal length of the eye observed is 50—20=10 centimetres, that is to say, it is a case of hypermetropia of 10 dioptres.

This very ingenious process is more delicate and consequently less practical than the preceding, inasmuch as the withdrawal of the mirror ofton provokes accommodation spasms in the person observed, which are injurious to the operation. Besides, the general method of mensuration of ametropia by location of the *remotum* does not lack inconveniences. It exacts always the assistance of an aid, it exacts a knowledge of the observer's amplitude of accommodation, and, finally, that amplitude being subject to variations, the results themselves, at least in measuring myopia, are sometimes erroneous.

2. *Skiascopy.*—It is, then, necessary to discover a method at once more exact and more practical. Such a method was discovered about 1872 by a French army physician, Surgeon-in-Chief Cuignet, at Lille, and popularized in 1879 by his pupil, Assistant Surgeon Mengin; it was received with great favor in England, and later in Germany[1] and has received the various names of *keratoscopy*, *retinoscopy*, *shadow-test* (Schattenprobe) and *skiascopy*.

All these names are more or less justified according to the theoretical explanation adopted for the phenomenon on which the method is based; but definitively since this phenomenon is a shadow, the denomination of *skiascopy* (from *skia*, *shadow*) is that which seems preferable. It may be said that this is, abroad as in France, the preferred process of the boards of examiners.

The fundamental phenomenon of this method is the illumination of the pupillary opening by means of a mirror and a moderate amount of light. If this illumination is practised at a distance varying from 10 or 20 centimetres from the eye observed up to 1 metre or 1 m. 20, at a given moment the pupillary opening is perceived to be lighted unequally. While one part is brilliant and luminous, another portion remains in shadow; it is remarked, besides, that this shadow is displaced whenever the mirror is displaced. Now, it is on these variations and displacements of the pupillary shadow relatively to the mirror that the entire method has been based.

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[1] See on this subject: Fuchs, Bericht über die 19 Versauimlung der ophthalmologischen Gesellschaft, Heidelberg, 1887. F. Dimmer. Der Augenspiegel und die opthalmoskopische Diagnostic. Leipzig and Wien, 1887; and above all the work inspired by Schweijger: Overweg. Objektive Bestimmung der Refraktion des Anges durch Skiaskopic. (*Deutsche militaraztliche Zeitschrift*, 1889, No. 4, p. 157.)

Let us say at once that, according as the observer is armed with a plane mirror or a concave mirror, the phenomena observed are diametrically opposed. And this is easily understood.

In effect, while the plane mirror illuminates the *fundus oculi* by means of parallel rays and while consequently the right edge of the pupil receives the rays from the left edge of the mirror facing it, the concave mirror reflects upon the eye convergent rays crossing at the focus of the mirror. This focus is generally 0.30 m. from the mirror. Now, as the examination is made at a distance of 0.60 m. to 1 metre, the luminous rays projected by the mirror cross at its focus, which becomes the source of illumination, and arrive at the eye only after this crossing. It results from this that the right edge of the pupil observed then receives the rays from the right edge of the mirror facing it, that is to say, a result optically inverse to that obtained with the plane mirror. Consequently, when the plane mirror will give a shadow on the right, the concave mirror will give it on the left; if the shadow is displaced from within outward with the plane mirror, it will be displaced from without inward with the concave mirror.

Besides, it is easy to see that the conditions of illumination and, consequently, of the shadow produced, will vary, when a concave mirror is employed, according to the distance from the eye observed at which this mirror shall be placed, while they will always be identical when a plane mirror is employed. In fact, with the concave mirror, according as the distance from the eye observed to the mirror is greater or less than the focal length of the mirror (0.30 m.), the eye will receive divergent or convergent rays, the shadows will be *inverse* or *direct*. On the contrary, with the plane mirror, the rays always being parallel, whatever be the distance of the mirror, the conditions of illumination and of the shadow produced will not change.

It is advantageous, then, for skiascopic examination, to use a *plane mirror;* it is the *plane mirror* which we recommend to boards of examiners, and it is with a *plane mirror* that we shall suppose the observer provided in the operations which follow.[1]

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[1] Given what precedes, if one has no plane mirror, than to make use of the concave mirror for the same tests. It will be sufficient simply to take the opposite of the indications given by the plane mirror, to remember that, if the shadow should proceed from within outward with the plane mirror, it will proceed from without inward with the concave mirror, that if the shadow is *central* with the plane mirror, it will be *peripheral* with the concave mirror, and reciprocally.

If then the observer, provided with a plain mirror, illuminates the pupil of the eye observed at a distance of 0.60 m. to 1 metre, taking care to make the eye observed look inward (so as to humor the sensibility of the *macula*, and illuminate as much as possible the papilla, which forms a reflecting *tapis*), and to direct the look of the person observed on some distant point (so as to relax his accommodation), this observer, alternately approaching and withdrawing, will see the pupillary opening at a given moment, illuminated on one side and bordered on the other with a crescent-shaped shadow, which is displaced when the mirror is displaced.

It is, as we have said, on the displacements of this shadow, relatively to the displacements of the mirror, that the diagnosis and measurement of ametropia has been established.

It may be always noted that the *circle of illumination*, that is to say, the zone of light projected by the mirror upon the face of the person observed, is displaced and moves in the same way as the mirror itself. If the mirror is displaced from left to right, the circle of illumination is also displaced from left to right, and reciprocally. To simplify the observations, then, the circle of illumination may be taken for the mirror, and the displacements of the shadow studied relatively to the displacements of the circle of illumination.

A shadow is called *direct* when it moves in the same way as the illumination, *inverse* when it moves in a contrary direction.

Under these conditions, in a case of hypermetropia or emmetropia, it is remarked that the shadow is direct; in a case of myopia, inverse. The whole of skiascopy flows from this observation.

In effect, to make the differential diagnosis of emmetropia and hypermetropia, it suffices to render the eye examined feebly myopic, for example, by placing before that eye a convex glass of 1 dioptre. If the observer (at 1 metre's distance and beyond), remarks then that the shadow continues to be displaced in the same way as the illumination, the eye observed is hypermetropic. If, on the contrary, the shadow becomes inverse, this means that the eye, rendered myopic by the addition of 1 dioptre of refringent power, was, before the augmentation, emmetropic.

As for the measurement of the degrees of ametropia, it flows from the same principle, and is made by discovering experimentally what glass, placed before the eye observed, will change the direct shadow into an inverse, or the reverse.

Thus, for hypermetropia, the trial spectacle-frame will be placed on the patient's nose, and the series of convex glasses will be tried successively in this frame, beginning with the weakest. The weakest convex glass which will change the direct shadow into an inverse shadow will give, to 1 dioptre nearly, the degree of hypermetropia.

For myopia, on the contrary, the series of concave glasses will be tried in the frame, and the weakest concave glass which will change the inverse shadow into a direct shadow, will give, to 1 dioptre nearly, the degree of myopia.

But these processes are of course long, delicate, and cannot be made adaptable to the programme imposed on army physicians. There is every necessity of their simplification, and we can, we think, arrive at this easily.

The first simplification which we have used for a long time, consists in taking as the basis of observation, not the displacements of the shadow, but its situation with regard to the centre of the circle of illumination.

In effect, if the centre of the circle of illumination projected by the mirror on the face of the person observed be determined mentally, the papillary shadow is seen, in every case of ametropia, to occupy a constant place relatively to this point.

If it occupies the edge of the pupil nearest the centre of the illumination, the shadow is called *central.* If, on the contrary, the shadow occupies the edge of the pupil furthest from the centre of illumination, it is called peripheral.

Now, in cases of emmetropia, hypermetropia and very weak myopia, the shadow is *peripheral,* while it is *central* in cases of myopia of a certain degree, with the plane mirror.

Inversely, with the concave mirror, the shadow is central in cases of emmetropia, hypermetropia, and a weak degree of myopia, while it is peripheral in cases of myopia in general.

This very simple, rapid and easily attained determination avoids, as may be seen, the comparison of the movements of the shadow with those of the mirror. Let us then distinguish the different states of refraction by this process (we suppose always that the observer is provided with a plane mirror.)

Hypermetropia.—The shadow, at any distance, is peripheral; it is more distinct and more intense in proportion as the hypermetropia is greater.

Emmetropia.—The shadow, at any distance, is peripheral ; it is very distinct and of medium intensity.

The distinction between these two states is made, as we have said, by placing before the eye observed, on a trial frame, a convex glass of 1 dioptre. If the eye is emmetropic, the effect of this glass is to give it an artificial myopia of 1 dioptre, that is to say, to give an inverted image of that eye at a distance of 1 metre. If then the observer is placed at a distance from the eye observed greater than 1 metre, he will perceive that image in a manner inverse to that which it had precedently, and the shadow, which was peripheral, will appear central.[1]

If, on the contrary, the eye is hypermetropic, for example by 3 dioptres, the augmentation of refringent power given to the eye by the convex glass of 1 dioptre is insufficient; it keeps an hypermetropic of 2 dioptres and the shadow remains peripheral.

In sum, hypermetropia and emmetropia both give a peripheral shadow ; but the two states are distinguished by placing a weak convex glass before the eye observed. If this glass renders the shadow central, the eye observed is emmetropic ; if the shadow remains peripheral, the eye observed is hypermetropic.

Myopia.—There are three cases in myopia ; 1st, myopia exceeding 1 dioptre ; 2d, myopia equal to 1 dioptre ; 3d, myopia less than 1 dioptre.

The degree of 1 dioptre has been taken as limit because it corresponds to a focal length of 1 metre and because that distance, with the plane mirror and ordinary illumination, is one that the observer will hardly overpass.

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[1] It is necessary for this experiment that the observer be placed at a distance from the eye observed equal to the artificial *remotum* of the latter (1 metre). Under these conditions, if the illumination is not excellent, it sometimes becomes difficult to observe the phenomenon of the shadow. A convex glass of 2 dioptres may then be placed before the eye observed, reducing the focal length and the inverted image of the latter to 0 m. 50. The observer will then, at that distance, perceive the shadow to be *central*, in cases of emmetropia. If he should perceive it at a less distance, it would mean that the eye observed was feebly myopia

First Case.—In myopia exceeding 1 dioptre, the image of the eye illuminated as formed at the *remotum* of that eye at a least distance of 1 metre and nearer the eye observed in proportion as the myopia is stronger. The observer, provided with the mirror, will then perceive this inverted image and will find it as much further as the myopia is weaker but always within his field of observation. The shadow will appear *central* and very distinct.

Second Case.—In myopia equal to 1 dioptre, the image of the eye illuminated is formed at the distance of 1 metre from that eye. The observer, placed at that distance, then perceives no distinct shadow; the pupil appears to him uniformly red, but with a diffuse dull redness, without brilliancy. If he withdraw further (and the illumination be sufficient) he will perceive a central shadow (he will perceive nothing if the light be insufficient). If, on the contrary, he draw nearer, he will fall into the following case:

Third Case.—In myopia less than 1 dioptre, the image of the eye illuminated is formed at the *remotum* of that distance exceeding 1 metre and therefore beyond the mirror of the observer. The latter then perceives an erect confused image and a shadow peripheral but with little distinctness or intensity.

In these last two cases, besides, if a weak convex glass of 1 dioptre, for example, is placed before the eye observed, so as to augment its myopia, the shadow becomes central and very distinct.

To sum up, strong myopia gives a central shadow. Weak myopia (less than 1 dioptre) gives a peripheral shadow with little distinctness or intensity; besides, if a convex glass of 1 dioptre is placed before the eye observed, that shadow becomes distinct but central.

Measurement of ametropia.—It is above all from the point of view of the measurement of ametropia that the process of simplification which we have indicated, that is to say, the consideration of the position of the shadow instead of its displacement, is serviceable. In fact, according to the ordinary process, it is necessary to find the manner of displacement of the shadow relatively to that of the circle of illumination and to note experimentally either the distance at which the displacement is made in a contrary manner or the glass which brings about this result.

Now, as Schweigger has justly remarked,[1] it often happens "that the movement of the shadow may be seen very well without our being able to say whether it is displaced in the same manner as the mirror or the contrary."

There is nothing of this kind when we base ourselves simply on the situation of the shadow. It suffices to determine mentally the centre of illumination and we then see at once whether the shadow is central or peripheral.

Under these conditions, nothing is easier than the measurement of ametropic states.

(*a.*) *Measurement of myopia.*—The measurement of myopia may be made by either of two processes, to wit: without glasses by the discovery of the *remotum*, or else by means of glasses, by correcting the defect of refraction.

First Process.—The first process is no other than that which we have already indicated for the measurement of myopia by the *remotum*; only, in the actual case, the shadow is substituted for the inverted image. This process is excellent for the measurement of medium myopia, from 1 to 5 dioptres.

It has been seen, in effect, that myopia gives a central shadow if the mirror is beyond the *remotum;* a peripheral shadow if the mirror is within the *remotum;* no shadow at all if the mirror is at the *remotum* itself.

If then the observer, provided with a plane mirror and placed at a distance of 1 metre, illumines the pupil, he will see a *central* shadow. Let him slowly approach the subject and there will come a point where this shadow will disappear and the pupil will appear a dull uniform red; then, within this point, the shadow will reappear, but less distinct and *peripheral.*

The point where the shadow disappeared corresponds to the point where the mirror coincides with the *remotum* of the eye observed. If then the distance which separates this point from the eye observed be measured, we shall obtain the focal length of the eye, that is to say, its degree of myopia.

This process is very much used in Germany. It is this to which of preference the German army physicians have recourse, and they employ it, not only for the measurement of myopia, but of all ametropic states. For that purpose they place before the eye observed a convex glass of 5 or 8 dioptres and discover experimentally the distance at which the *remotum* of the eye, thus artificially shortened, is found. The focal length of the eye observed is then given there by the formula x = F — r, in which *x* is the focal length of the eye observed, F the focal length of the glass employed and *r* the artificial *remotum*.

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[1] Overweg. Objective Bestimmung des Refraktion des Anges. (*Loc. cit.*)

This process is good, on condition of always repeating the test two or three times and taking the average of the results, which does not allow it to be brief. Besides, this method necessitates the presence of an assistant to measure the distance which separates the mirror from the eye observed.

Schweigger, it is true, has constructed with this end in view a plane mirror furnished with a metric tape the extremity of which is held against the eye observed and which, rolling up automatically when the observer approaches, may be stopped at the distance wished. But this apparatus is not very practical.

Finally, this process will not serve for myopia less than 1 dioptre, which does not give a central shadow at the ordinary distance of illumination, nor for myopia exceeding 5 dioptres, the focal length of which is very small and consequently difficult to measure exactly.

We had better, therefore, have recourse to the following process:

Second Process.—This process consists in placing successively before the eye observed, by means of a trial frame, the ascending series of concave spherical glasses and in observing the pupillary shadow with each glass. The weakest glass which changes the central shadow into a pheripheral shadow gives, within 1 dioptre, the degree of myopia. In effect, as weak myopia, up to 1 dioptre gives a pheripheral shadow, however indistinct, it is necessary, to have the exact degree of myopia sought, to subtract 1 dioptre from the weakest glass which gives a peripheral shadow.

(*b.*) *Measurement of hypermetropia.*—The same process is applicable to hypermetropia. It will suffice, in effect, to pass before the eye observed, with the trial frame, the ascending series of convex spherical glasses and to examine the pupillary shadow to find, at a given moment, a glass which changes the peripheral shadow into a central shadow. The weakest convex glass which brings about this result, gives, within one dioptre, the degree of hypermetropia.

It will be impossible, every time, for a board of examiners to submit every ametropic subject to so long a test as one which should consist in passing before his eye the whole series of concave or convex glasses, in order to determine the degree of ametropia. For this reason we must here make use of a second simplification.

This simplification consists, the nature of the ametropia being given, in finding rapidly the degree of that ametropia compatible with military service.

In whatever concerns hypermetropia and astigmatism, it is useless to set out on this search, since these states are not of themselves causes of exemption nor of auxiliary service and in such forms of ametropia there is nothing to be considered, from the medico-military point of view, but the degree of visual acuity.

It is only from the point of view of myopia that the quest must be undertaken. Now, the degree of myopia which serves as criterion for the boards of examiners is, according to the instructions of 1894, 6 dioptres.

The problem consists, then, given a myopic eye, in determining what glass must be placed before that eye to become certain that the myopia is not greater than 6 dioptres.

This glass is a concave glass of 5 dioptres.

In fact, by keratoscopy the myopic eye gives a *central* shadow when the myopia exceeds 1 dioptre, and a *peripheral* shadow when the myopia is less than 1 dioptre. Suppose, then, a myopic eye, of X myopia, giving by keratoscopy a central shadow ; if from the refringent power of this eye we subtract 5 dioptres, three cases may present themselves.

1. Either the eye had myopia of 6 dioptres, in which case there would remain amyopia of $6-5$ dioptres $= 1$ dioptre ; it would then give, at the ordinary distance, a weak and indistinct peripheral shadow, which, if the mirror should be withdrawn beyond 1 metre, would be transformed into a central shadow ;

2. Or the eye had myopia stronger than 6 dioptres, in which case there would remain a myopia of $< 6 < 5 = < 1$ dioptre ; it would give a central shadow at the usual distance.

3. Or the eye had myopia weaker than 6 dioptres, in which case there would remain a myopia of $> 6 > 5 = > 1$ dioptre; and it would give an indistinct peripheral shadow at any distance.

From which we may conclude that if a concave glass of 5 dioptres, placed before the eye to be observed, does not change the central shadow into a peripheral shadow, it is because the myopia exceeds 6 dioptres.

Astigmatism.—The diagnosis of astigmatism by means of keratoscopy is easy enough, because the pupillary shadow, instead of assuming the form of a crescent or half-moon, then assumes the most varied forms.

The most usual form (there is no question now of regular astigmatism) is that of a spindle or hourglass, sometimes central, sometimes more or less peripheral, according as the astigmatism is myopia or hypermetropic.

But as for the measurement of this ametropia by means of skiascopy, it must be avowed, whatever authors say of it, that the results are very imperfect. That has, besides, no importance for the army physician, since he need not measure astigmatism, the only point which it is important for him to know in cases of astigmatism being the degree of visual acuity.

(In the article which is to follow the determination of the fitness for service and the method of the fitness of examination by Board of Examiners will be discussed.)

MONOCULAR GRANULAR CONJUNCTIVITIS.

By Dr. **H. V. WURDEMANN** (Milwaukee, Wis.).[1]

Granular conjunctivitis is commonly met with of nearly equal severity in both eyes, but the monocular form is of rare occurrence and few references[2] will be found in the rather voluminous literature appertaining to this subject. During the last six years of private practice I have met with but three instances of the kind among 287 cases of chronic granular conjunctival inflammation Among these were 188 cases of follicular disease (in the stage o proliferation of the epithelial elements) and 99 cases of the stages of the disease commonly designated as trachoma, i. e., lymphoid infiltration (stage of superficial destruction of the epithelium) and the trachomatous state (stage of total destruction of the epithelial elements).

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[1] Read befere the Milwaukee Medical Society, March 10, 1896.

[2] *Mutermilch, Jules.* "Pathological Anatomy of the Chronic Affections of the Conjunctiva." ANNALES D'OCULISTIQUE, 1892; also Translation by M. F. Weymann. (*Ophthalmic Record*, April, 1893.)

Mutermilch, Jules. "Trachoma." ANNALES D'OCULISTQUE, January, 1893; also Translation by L. Webster Fox. (*Ophthalmic Record*, March, 1893.)

Case I.—R. N. R. Age 23. Irish ancestry. A newsboy on railroad train. Applied for treatment June 2, 1891. Had sore right eye for several years. He came with severe granular conjunctivitis with great lymphoid degeneration of the retrotarsa fold of the upper lid and of tarsal conjunctiva. Lid was thickened so that it simulated ptosis; extensive rough pannus o cornea. Patient anæmic and from his business is exposed to smoke, dust, cinders and other mechanical irritants. Was given tonics and cod liver oil with special diet, under which he gained in general health, and was treated for two months by atropin sublimate and silver. The granulations were expressed in Augus of that year, had several relapses, but was eventually cured by massage with ointment of yellow oxide of mercury and application of blue stone after one and one-half year's treatment. Patient has been seen occasionally to the time of writing, and has remained free from the disease. The left eye has always been healthy.

The resultant vision in the affected eye equals 6-XII, the diminution being due to irregular astigmatism.

Case II.—A. S. Age 30. Irish ancestry. Locomotive firemen, applied for treatment June 10, 1895. Anæmic and roomed in a crowded boarding house with probable unhygienic environment; has had sore right eye for six months; been under treatment by several oculists; severe granular conjunctivitis limited to the right eye; thick pannus of the cornea. Was put in better surroundings by being sent to the hospital where he was operated on a few days later by expression of the granulations with the roller forceps, combined with brossage and canthoplasty. After two months' treatment he was able to return to work, but a few days later came back with pannus, which was again relieved. During the winter he contracted central corneal ulcers, which was very slow in healing, leaving a central leucoma with resultant diminution in vision.

Case III.—C. E. Age 20. German ancestry. A hostler, applied February 12, 1896. An apparently healthy man, came with monocular granular conjunctivitis in the third stage with beginning cicatricial contraction and extensive pannus over the whole cornea. He was sent to the hospital where the expression and brossage operations, together with canthotomy were done. Since that time he has made steady progress towards recovery; is at present under treatment by massage with yellow oxide ointment and with papoid and boric powder.

The three cases were of unusual severity, were attended by pannus and ulceration of the cornea and subject to relapses. In each case the other eye remained absolutely free from any stage of the disease, and has never at any previous or subsequent time been affected.

This fact lends weight to the objection raised as to the alleged specific nature of granular conjunctivitis. This point has been combatted in a previous article.[1]

We believe that several kinds of infections or irritations may give rise to this condition; that the trachomatous state follows that of follicular inflammation through which it must have first passed and that malnutrition, unhygienic surroundings and local irritation, as well as infection, are all factors in the development of trachoma or granular conjunctivitis.

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[1] *Würdemann, H. V.* "The Pathology of Granular Conjunctivitis" (*Ophthalmic Record*, October, 1894; also Transactions, Wis. State Medical Society, 1894.)

SUBCONJUNCTIVAL ECCHYMOSIS TREATED WITH ESERINE.

By Dr. **G. HUBERT BURNHAM** (Toronto, Canada).

In this account I have reference to the so-called benign hemorrhages only. In this typical case of which I am about to give an account of, no cause, whatever, could be found.

A lady, the wife of a surgeon of this place, consulted me at least two years ago, respecting the bloodshot appearance of her left eye. She said that the first attack was about five years ago, and that it came on without any reason she could think of. These attacks were becoming more frequent and much more extensive, so that the whole inner half of the eyeball would be covered.

The onset was sudden and often a sensation of pricking would warn her that a hemorrhage had taken place, but oftener no sensation, whatever, and the startled look and exclamation of a friend, regarding her eye, would be the first intimation. During this period of five years she had been under careful treatment without any result.

The usual course, apart from constitutional remedies, is a lotion as a placebo. In this case no constitutional treatment was given as no indication could be found. However, these attacks had become so frequent and severe that if a curative remedy were not found my patient would have to retire to a great extent from society. I ordered sulphate of eserine gr. ¼. ad 1 dram, to be freely dropped into the eye twice to thrice daily. She said absorption of the hemorrhage took place more quickly than usual. It was continued for one week or so after the ecchymosis had disappeared. At the end of one month another attack took place, which was treated as above. A third attack about two months later was the last one. Since this a period of two years has elapsed and no recurrence has taken place.

I think this favorable result may, from the history given, be ascribed to the eserine. Several less marked cases have been similarly treated by me and all with the same radical result. I have taken the liberty of drawing the attention of oculists to this remedy as I have never before heard of its application in affections of this nature.

AN EASY METHOD FOR SEEING THE CAPILLARY CIRCULATION IN ONE'S OWN RETINA.

By Dr. **C. E. NORTON** (Lewiston, Maine).

Studying the phenomenon of the capillary circulation in one's own retina, as pointed out by Dr. Darier, in the September number of the ANNALES, is extremely interesting, but it is very difficult by any method generally known to the scientific world. To point out a method by which any one may easily see the phenomenon at any time, is my object in writing this.

About the year 1878, while looking at an eclipse of the sun through a piece of dark-blue cobalt glass, I first saw the phenomenon. I was greatly surprised in apparently seeing bright objects moving in all directions over the sky, with a peculiar motion. By careful observation I soon noticed that when looking steadily in one direction these bodies followed regular paths, all connecting with each other, and that there were none for a little space around the point of fixation, corresponding to the macula lutea. I also noticed that when turning my eye, the whole appearance moved with it.

I soon saw that it was an entoptic phenomenon, and observation showing its similarity to the circulation in the foot of the frog as seen under the microscope, I was convinced that I was seeing the circulation in my own retina.

This circulation can be seen by any one on looking at the clear sky, free from clouds, through one or more thicknesses of very dark-blue glass. It can be seen by using a single thickness of glass, but I find the result is better when using two or more thicknesses. Having once seen this, it is very easy to see it afterwards. I have observed it many times, especially when much fatigued, without the use of any glass, when looking at the sky, or even a blank wall.

Another interesting thing may be seen by the use of this glass. While looking at the sky with the glass near the eye, if it is suddenly moved away five or six inches, a magenta-colored disk, corresponding in relative size and location to the macula lutea, is perceived. The color of this disk is most intense near the centre, shading off gradually into the surrounding blue color.

CLINICAL NOTES.

Operation for Cicatricial Entropion; Pot-Hook Hæmostatie Palpebral Forceps; Surgical Finger-nail; Curability of Granular Ophthalmia.

By Dr. **W. NICATI.**

I.—My operation for cicatricial entropion (see *Archives d'Ophthalmologie*, 1883, p. 399, and *Thèse d'Adme*, Montpelier, 1885), consists of a resection of the tarsus done at the internal surface of the lid and followed by the insertion of one or of several sutures joining subcutaneously the tendon of the levator with the skin at the ciliary border.

It unites the advantages of the previous proceedings of Streatfield, Snellen, Anagnostaxis and Panas, in that it preserves entirely and absolutely the skin of the lid. Originating in a country where granulations are most prevalent, where entropion is coin current, it has there had its tests.

This note is designed to indicate an important practical improvement in the execution of this operation.

Until the present time I employed the fingers, thumb and index, placed one in the cul-de-sac, the other under the skin of the reversed lid to control the hemorrhage and to fix the field of operation. This was not adopted without some hesitations from the fact of the insecurity and the failure of rigidity of the fingers. The improvement consists in replacing the fingers by a forceps, the pot-hook haemostatic forceps, upon the model of the ligature forceps of Péan but with linear branches and with catches to graduate the pressure.

The following is the operation procedure.

The forceps are applied horizontally, the lid being everted, one branch in the cul-de-sac, the other on the skin immediately above the lashes, the handle naturally directed outward. The forceps being placed and seized by the left hand, or given to an assistant, the tarsus presents itself as a projecting mass with the conjunctiva attached to its surface. The resection is made by a bistory by horizontal incisions, slowly and progressively, in such manner as to preserve the conjunctiva which contracts as the dissection is made. The palpebral margin is, naturally, left intact, with a sufficient extent of cartilage. After the resection come the sutures, two, three or more ; metallic loops are introduced at the base of tarsus close to the forceps, and tied externally upon the skin immediately above the lashes.

The after treatment of the operation could not be more simple. After two or three days of application of a pressure bandage the lids may be left free. The sutures are removed after the fifth day. No deformity is recognized except in case of excessive resection of the cartilage by an accentuation of the concavity marking the palpebral border. I should, therefore, warn operators against too extensive resections. Beyond this æsthetic disadvantage which may not involve any inconvenience the operator should prevent the inevitable change of expression caused by the perfect correction of entropion. To the languid physiognomy, with drooping lids, succeeds the opposite expression which is the vivacious with the lashes raised and the eyes widely opened. There are faces which are the gainers by this and others to which it is a disadvantage.

II.—I am led to make some general remarks the first of which is in respect to the hæmostatic procedure for the eyelid which has just been described. This procedure deserves to be generalized, whether the fingers are used or whether the forceps are brought into service. The finger-nail placed in the cul-de-sac, in the majority of cases, advantageously replaces the plate of the Desmarres forceps, and the index finger held upon the skin serves the same purpose as the narrow blade of that forceps.

A second remark relates to the employment of the finger-nail in general, that valuable instrument for the oculist so well described by surgeons. I think that the large and strong nail is more easy to render antiseptic than the short and close one, and I especially think that there is in our delicate touch an inestimable advantage. It holds a prominent place when we speak of granulations. At the congress of the Ophthalmological Society in 1884[1] I have been careful to describe, but without any claim to priority the procedure for the expression of the substance from granulations and I stated that I accomplished it by the finger-nail and upon the nail. It is a marvelous instrument which doubles the feeling by which the presence of granulations is recognized. With what care may one reach the very depths of the cul-de-sac. If one would replace it, it would certainly not be by curettes and brushes more or less injurious recently invented to which one would have recourse. Much better than they, a blunted spatula will serve to separate the diseased patches of the conjunctiva from the healthy tissue and to express from them the granular substance.

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[1] In the discussion on the employment of jequirity.

The last observation finally suggests itself to me by the correspondence of a colleague who speaks of our inability to cope with granular ophthalmia according to the text-books. It should be well known that granular ophthalmia wrongfully bears this bad reputation. On the contrary, no disease lends itself more effectively to treatment and the operation for cicatricial entropion especially should be regarded as one of the triumphs of our art equal to that of artificial pupil and of cataract.

A CASE OF PARALYSIS OF THE FIFTH PAIR.

By Drs. **WERTHEUN-SALOMONSON** and **WESTHOFF.**

(Translated and abridged from the original Dutch by M. SULZER.)

A case of complete paralysis of the right fifth nerve, in a patient fifty-four years old, presenting gummous growths of the tibiæ and the penis. The paralysis comprised not only the three sensory branches but also the motor part (masticating muscles). When the patient opened his mouth, the lower maxillary deviated to the right ; the displacement of the lower maxillary forward is impossible. Taste was completely lacking in the anterior two-thirds of the right half of the tongue. All the left side of the face and of the scalp (up to the vortex) was insensible.

The conjunctiva of the right globe was strongly injected, without increase of the secretion. A ring-shaped membraneous production, 2 millimetres in size, had been formed between the sclero-corneal limbus and the pupillary area of the cornea. This last was slightly disturbed. The conjunctiva and the cornea was completely anæsthetized. The tension was normal. Under the action of the mixed antispecific treatment and with the eye covered by means of a protective bandage, the hypertrophied edge of the cornea diminished slowly and ended by disappearing, but the membrane remained still disturbed. Its epithelium was intact. After a prolonged absence of the patient, the iris was found adhering to the lens in two places.

Before presenting himself for observation, the patient had had several attacks of epistaxis and the skin of the cheek was found infiltrated from the time of the first examination. This infiltration augmented during the period of observation, and two large superficial ulcers could be seen developed at the side of the nose. After five months' observation, the patient died with bulbous phenomena. No autopsy.

The authors retrace the history of the theory of trophic action of the trophic fibres of the fifth pair. In what concerns the case observed by them, they arrive at the following conclusion : the neuroparalytic keratitis observed differs considerably from the alteration described under this name. It constitutes a variety of that affection and takes, under the influence of syphilis, a peculiar character, different from that of the commonplace form.

The famous experiment of Snellen demonstrates that nervous paralysis does not suffice, of itself, to produce neuroparalytic keratitis. As soon as we admit that another influence besides nervous section is necessary, in order to produce the so-called trophic symptoms, we understand the differences marked in the symptoms of neuroparalytic keratitis. If the lesions consequent to anæsthesia allow the germs of suppuration to penetrate into the deeper tissues, the morbid process will be different from that produced by streptococci introduced by a defect in the epithelium. Is it not probable that a general infection, such as syphilis, may seize upon points which have become much less resistant in consequence of nervous paralysis. Every time that the legs of our patient underwent any slight traumatism, the clot of blood, which would disappear without leaving a trace in a healthy individual, would be transformed in his case into an ulcerating gumma, which would be cured only after some time and by a deep and adherent cicatrix.

II.—REPORTS OF SOCIETIES.

SOCIETIES

OPHTHALMOLOGICAL SOCIETY OF PARIS.

Session of April 14, 1896.

Blepharoplasty by Displacement.

Dr. Darier presented a case in which he had removed an epithelioma from the lower eyelid. To overcome the loss of matter, he had performed blepharoplasty by displacement, according to the process of Pagenstecker-Knapp. The result was most satisfactory.

A Case of Congenital Aniridia.

Dr. Duboys de Lavigerie presented the case of a little girl with congenital bilateral aniridia. She presents, besides, some peripheral crystalline opacities. The visual acuity is reduced to $\frac{1}{5}$, but near by the patient reads quite easily. No other anomalies exist, and there is nothing unfavorable in the antecedents of the patient.

Dr. Despagnet.—In the observation I have published relative to a family in which numerous cases of aniridia existed, I have pointed out that the aniridia was never complete, and that traces of the iridicun membrane persisted.

Dr. Morax.—Dr. Parinaud, two years ago, operated upon a young girl, twenty-one years old, with congenital bilateral aniridia, in whose case a cataract developed in one eye in a rapid manner and without appreciable cause. The ocular globes were normally developed, but the iris was wholly lacking. In the right eye there existed a diffuse posterior polar opacity, which reduced the acuity to $\frac{5}{30}$. In the left eye, the lens was the seat of a complete milky cataract, which, according to the information furnished by the patient, had developed within the space of one month. It was a case of soft cataract, which could be easily evacuated by an incision with a lance-knife. No peculiar fact in the personal or hereditary antecedent of the patient has been withheld.

Purulent Ophthalmia of New-born Children; Complications Induced by Unseasonable Treatment; Prophylaxis.

DR. CH. ABADIE.—Drs. Van den Bergh, Defiz and Romiée, have reported a number of examples of ophthalmia of the new-born, in which grave complicatious of the cornea have been developed in consequence of washing with more or less concentrated solutions of sublimate.

These complications consisted generally in an infiltration and a whitish opacity occupying all the thickness, but rarely the entire extent of the cornea. In taking on this whitish, milky aspect, this membrane seems to lose at the same time a part of its resistance, for its form becomes more rounded.

At first it is infiltrated but not ulcerated, and it is only if one continues the application of solutions of sublimate instead of suspending them, that it arrives at ulceration and perforation.

In most of the cases thus far observed, this lesion, annoying for the first few days, has been quickly relieved, and has even disappeared entirely, as soon as the irritating action which provoked it, that is to say, the bathing with sublimate, has been suppressed.

By leaving the child quiet, and being content to instill daily from one to two drops of atropine, the corneas quickly return to their perfect transparency. I have just been witness, among my patients, of two cases which enter completely into the category of those described by the authors I have just cited.

These facts are still more interesting to know, as they may give rise to very sad mistakes for the little patients.

In purulent ophthalmia, in fact, the disease may of itself, in grave cases neglected at the outset, be accompanied by lesions of the cornea almost like those which are provoked by the use of sublimate. Then, if, instead of considering the corneal lesion as due to the injurious action of the sublimate and at once suppressing the lotions, the treatment is redoubled in vigor, believing there is an aggravation of the disease, the catastrophy is certain.

To avoid this mistake, account must be taken of the following differential signs :

When the corneal lesion depends on the disease itself, it appears at first only in the grave forms neglected at the outset. Then the infiltration, instead of being a diffused milky white, without ulceration, begins with a circumscribed yellowish point, followed quickly by loss of material from the corneal tissue. Finally, what is still best in doubtful cases, is never to employ lotions of sublimate, or, at least, to suppress them as soon as the cornea seems menaced.

In his article, Dr. Romiée profits by the occasion to criticise in a rather severe manner, the prophylactic treatment of purulent ophthalmia, including even the Crédè system, which has seemed, nevertheless, to enjoy great favor among *accoucheurs*.

I do not go perhaps so far as Dr. Romiée, but I find, with him, that more discernment and reserve must be brought to this preventive treatment.

I believe the instillation of one or two drops of nitrate of silver in a two per cent. solution, may be really useful when there is really infection. We know in fact certainly that nitrate of silver has a sure efficacious action on the gonococcus. Its curative properties are undeniable when the disease is confirmed, its prophylactic properties seem probable when the infection is recent.

But in systematically employing the instillation of what is on the whole a rather strong solution of nitrate of silver, it happens that a veritable ophthalmia of a chemical kind is provoked which may impose on the people about and especially on the midwives as a veritable purulent ophthalmia. Then, instead of letting this ophthalmia, which they have provoked, disappear of itself, they go to work to take care of it as a vernal spontaneous purulent ophthalmia. Little as they may continue then the cauterizations, the always injurious bathing with sublimate, etc., this disease which has been manufactured out of whole cloth, which they nevertheless continue to nourish, will aggravate and will end by the corneas being compromised.

I believe the true prophylaxis, the most sure, consists in avoiding as much as possible allowing virulent substances to contaminate the conjunctival surface of the child.

I am not at all certain that if this contamination takes place the instillation of some drops of nitrate of silver or a little iodo form suffices to prevent the development of a purulent ophthalmia, which is the habitual consequence of it.

In any case, the peremptory proof has not been given.

To resume, I would say: when a child comes into the world, all possible precautions should be taken that he be not contaminated at the moment of passing through the vaginal canal.

Every woman having a suspicious discharge should be carefully disinfected. Immediately after birth the child's eyes and the adjoining skin should be carefully cleansed with any inoffensive aseptic solution, either borax and water or simply boiled water, so as to remove any septic matter which may have penetrated into the conjunctival cul-de-sac.

If disinfection with regard to the mother prove after all insufficient and a purulent ophthalmia is feared, we may have recourse to the Crédè system, by the instillation of one or two drops of a 2 per cent. solution of nitrate of silver in the conjunctival cul-de-sac. I still prefer this means to the insufflation of iodoform. One ought equally to abstain from bathing with solutions of sublimate, the irritating action of which, superadded to that of the nitrate of silver or iodoform, can only aggravate the situation.

If, at the end of forty-eight hours, the purulent secretion increases, if the tumefaction of the eyelids is rather exaggerated than diminished, it proves that in spite of the prophylactic treatment we have before us a true case of purulent ophthalmia. From this time we apply the habitual treatment for ophthalmia of the new-born with 2 or 3 per cent. solutious of nitrate of silver. If lesions of the cornea are produced, the assistance of an oculist becomes necessary, for the direction of the treatment becomes very delicate and sometimes exacts consummate experience.

DR. VALUDE—I am entirely in accord with Dr. Abadie in recognizing that nitrate of silver employed rashly, and sublimate under all circumstances, may have the worst effects upon the eyes of children. We frequently have occasion to remark this and find the greatest difficulty in restoring corneas altered in consequence of badly directed treatment. I will even add this, apropos of the prognosis, that the injury to the cornea arises sometimes without being announced beforehand by any grave modifications with regard to the conjunctiva. It has happened to me three times of late to be called to children whose local condition was as follows: eyelids very little swollen, no chemosis, no suppuration and cornea intact; in sum, a satisfactory condition. There existed at the bottom of the cul-de-sac, a little grayish layer indicating abuse of the caustic or the continued use of sublimate. In such a case I might have pronounced a favorable prognosis if I had not had the experience of facts heretofore observed, which had rendered me suspicious. In fact, on the following day, the cornea began to become opaque and I then saw a series of grave accidents unfold, difficult to contend with, although, naturally, every caustic application was immediately suppressed.

Dr. Abadie himself has very well exposed the inconveniences of nitrate of silver employed as a prochylactic agent at birth, according to the method of Crédè. The conjunctival catarrh which results from it, may be mistaken for the beginning of ophthalmia and lead to rash therapeutics. It is exactly to avoid these catarrhal conditions that I have proposed insufflations of powdered iodoform, which give no better results than the method of Crédè but have not its inconveniences.

DR. DESPAGNET—Since the multiplication of antiseptics, accidents are seen much more. frequently than formerly, in the time when the treatment of the ophthalmia of new-born infants was made simply with solutions of nitrate of silver. From the prophylactic point of view, I agree with Dr. Abadie. At the maternity ward of St. Germain I have, for a year, caused all the new-born infants to be bathed freely with borax and water. The average of ophthalmia has been very small, not exceeding 2 per cent. From the point of view of the prophylactic value of nitrate of silver, I will point out to you the case of a lady who had three confinements and whose three children had ophthalmia of the new-born. The third was infected although all possible antiseptic precautions were taken with regard to the mother and in spite of instillations of nitrate of silver made in the eye immediately after birth.

DR. VALUDE.—I cannot let the doctrine enounced by Dr. Galezowski apropos to the prophylaxis of ophthalmia, which rejects all action upon the eyes of the infant as useless, go by without protest. This method has shown proofs, and it is impossible to wage war against the results furnished by statistics gathered in Germany amounting to thousands of cases.

Dr. Despagnet recommends liberal bathing with warm water and borax. I am entirely in accord with him, and that is evidently an excellent mode of prophylaxis, but it is unfortunately inconvenient in spite of its apparent simplicity. It is proved, in fact, by the statistics of Olshausen that the prophylaxis doubles in value if the disinfection of the eyes take place immediately after birth, *before the cord is tied.* Now, I do not believe that, outside of maternity wards where the service is performed by nurses especially habituated to this necessity, it would be easy to thoroughly bathe the conjunctival cul-de-sac of a child. It is an operation that demands a great deal of care, and it is much easier to let fall between the half-opened eyelids a drop of liquid or a pinch of powder. We must think of the children born in surroundings where such cases are less understood, and as such are the most numerous, it is above all with such that we must be preoccupied. Let us prescribe, then, the simplest means and the easiest to put in practice. I repeat that my choice falls on iodoform, because it is not an irritant like nitrate of silver or lemon-juice.

Dr. Vignes.—I have experimented with iodoform in comparison with a 2 per cent. solution of nitrate of silver, and I have found the powdered iodoform to give more conjunctival reaction than the silver solution.

Dr. Jocqs.—I have recently observed a case analogous to those which Dr. Abadie has communicated. It is the case of a child in whom the instillation of lemon-juice had provoked a slight conjunctivitis which, treated with lotions of sublimate, ended on the fourth day in disease of the cornea.

Dr. Galezowski.—I believe that the prophylaxis of the ophthalmia of the new-born, maternal disinfection alone has value; action on the eyes of the child is useless and even injurious, for the introduction into the conjunctiva of irritating substances, liquid or solid, gives reactions which deceive us, and may lead on to rash treatments such as Dr. Abadie has pointed out. As treatment, I prescribe the use every other day of a solution of $\frac{1}{40}$ of nitrate of silver, to be neutralized with salt water; with this treatment, we may contend with safety against all ophthalmia of the new-born.

Dr. Kalt.—Some years ago in the treatment of ophthalmia of the new-born, I tried the employment of a solution of $\frac{1}{20000}$ of sublimate, but I was compelled to give it up, for even in that state of dilution, the irrigation determined excessively violent sufferings. I have seen superficial ulcerations of the cornea developed in patients with blenorrhagic ophthalmia even after the treatment had been suspended and when the secretion was arrrested.

Dr. Gorecki.—What seems to result from this discussion is, that the greatest necessity is a good oculist who takes good care of his patients. I cannot avoid calling your attention to an unfortunate circumstance which happened to one of our confréres whose child had ophthalmia and who, having misunderstood the prescription, gave instillations of nitrate of silver repeated every hour, instead of lotions of borax. The result was a complete destruction of the two corneas. As for iodoform, I may say from my personal experience that it is very slightly irritant.

Dr. Abadie.—I am glad to see that we are all in harmony on the subject of the improper use of sublimate. I was anxious to establish this fact thoroughly, for cases have been multiplying since the midwives have had solution of $\frac{1}{1000}$ of sublimate at their disposition. I have put aside the question of treatment, which have been definitively resolved in favor of nitrate of silver in solution.

Modification in the Operation for Strabismus.

Dr. Galezowski prescribes after tenotomy the vertical suture of the conjunctiva, instead of the transverse suture; he thus increases the effect of the operation.

He has cured in this way by simple tenotomy a strabismus of 17°.

Dr. Vignes called attention to the fact that these sutures are referred to in the treatise of de Wecker-Masselon.

Therapeutic Action of Facial Erysipelas on Various Ocular Affections.

Dr. A. Terson.—The manifold and redoubtable ocular complications of facial erysipelas are mentioned in every treatise on ophthalmology and have been the subject of important monographs; but it is not so with regard to the happy influence which an intermittent erysipelas may exercise upon an ocular affection It is important then to set over against the dangers of periodica erysipelas, such of its complications as are in a way beneficent. The therapeutic action of erysipelas is, on the contrary, better known in general surgery, especially in the pathology of tumors. Dermatologists, again, have recently drawn attention to the amelioration, after erysipelas, of cancroids and lupus of the face, and to the toxitherapic effects which are the logical consequence of these demonstrations. In addition to its action upon epithelioma and lupus of the eyelids (which are at least as interesting to the opthalmologist as to the dermatologist), many often rebellious conjunctival affections, such as trachoma and leprosy, and even intraocular effections, such as iridocyclitis, may receive from erysipelas such amelioration as merits being closely examined, at least from the clinical point of view, which should be the classical.

Dr. Terson has observed a highly developed case of conjunctival leprosy, where erysipelas ameliorated very much the condition of the eyelids and caused the leprous pimples of the conjunctiva to disappear wholly ; it was only after six months that the beginning of a relapse took place and then on one side only.

The complete disappearance of trachoma or of pannus has also sometimes been pointed out in the course of a case of erysipelas (Ausitidisky, Koltchewin, Rampoldi, etc.), and, in cases of unilateral erysipelas, the disappearance of trachoma has also been unilateral.

This is not the only property of erysipelas ; irido-choroiditis and orbital tumors have also been very much improved by it (Wolb, Nieden).

Finally, a general infection, such as pneumonia (Rampoldi), or cholera (Zanchi, Delens), may cause the disappearanee of trachoma, and even of orbital lymphadenoma.

The action of the neighboring parts is at least as important as the general action, and, if the conclusions of Hallopeau and Roger on the toxitherapy of lupus be read, it must be recognized that, if the toxitherapy of trachoma and of certain lesions which have sometimes resisted all treatment seems to be able to give results, nothing proves them to be durable if we refer to the *momentary* action of erysipelas and of general infections. Nevertheless, ophthalmologists must follow with great interest, experiments of this nature, susceptible of progress, which surgeons and dermatologists are making.

M. GORECKI.—I wish to recall only one point of Dr. Terson's communication, that is, that certain toxines, applied in the neighborhood, or at a distance from the eye, have had an action on ocular inflammatory processes. It is thus too with the toxine of the fly-blister, which in certain cases has an evident action.

Treatment of Tubercular Iritis by Gualacol.

DR. VIGNES.—I have heretofore shown that it is *nosographically* necessary to differentiate, among cases of iritis, a tubercular variety, and to distinguish the miliary form of tuberculosis in the focus of the iris and that of the trabecular region. The absence of pathognomonic signs at the outset of the affection renders the diagnosis difficult. Nevertheless for the greater part of the time the eye presents a peculiar appearance which should make us think of the presence of bacilli.[1]

The ordinary therapeutics of the other varieties of iritis (mydriatics, paracentesis, mercurials, salicylate, igneous revulsion, etc.,) remains absolutely inefficacious and may cause the loss of precious time. Guaiacol in an oily injection ($\frac{1}{115}$) has seemed to me to possess a real curative power. Its employment has brought about sudden and very sensible ameliorations in cases where the just cited means had given no result.

MEDICAL AND SURGICAL SOCIETY OF BORDEAUX.

Session of February 14, 1896.

Clinical Value of Electrolysis in the Treatment of Contraction of the Lachrymal Passages.

DR. LAGRANGE brings forward ten new observations in favor of the treatment of inflammatory lachrymal contractions by electrolysis. It is the highest degree important not to destroy the mucous membrane of the lachrymal passages; it is sufficient to modify it, to soften it, but without going so far as an eschar; for we must not trust to that pretended soft eschar which in negative electrolysis would not be followed by a reparation like that which ordinarily overcomes loss of material.

A rigorous technique, then, is necessary: rheostat permitting the exact graduation of the action of the current, a periodic galvanometer for the exact measurement of the intensity, insulated probe. This probe is composed of a silver stem, hollowed at the upper end. In place of the metal taken away it is coated regularly, layer by layer, with the substance of which urethral bougies are made, a substance very smooth and soft to the touch; thanks to the previous hollowing of the metallic stem, this insolating coat does not increase the calibre of the probe, which is Bowmann's No. 2. The lower end of this probe is free for an extent of about 2 centimetres, corresponding in the lachrymal passage to the extent of the nasal canal; the insolated part corresponds to the lachrymal sac and the canaliculus, thus one avoids electrolysis of the canaliculus, which with an ordinary metallic probe would produce a cicatricial contraction at that point.

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[1] Vignes, 'D'Iiritis Tuberculeus." Communication to the Congress at Rome.

Before the introduction of the probe, no relief of the contraction by incision, but simple preliminary dilatation with a handled instrument representing an Anel's conic stylet with the addition of the little olive of Weber's dacryotome.

Manual of electrolysis: dilatation of the punctum and the canaliculus, introduction of the insolated probe communicating with the negative pole; positive pole in the corresponding nostril. By means of the rheostat the current passes slowly, increased to 5 milliamperes, returning to 0 after five minutes. Antiseptic injection.

Electrolysis is only to be recommended in inflammatory contractions, when it gives excellent results, as is shown by the cases so treated.

On the other hand, it should not be employed in cicatricial contractions, for in destroying these last, the mucous membrane is destroyed and a new and more serious contraction created: recourse should rather be had to stricturotomy according to Stilling's method.

Dr. Armaignac had treated inflammatory and other contractions according to the same process as Dr. Lagrange, and had seen them reproduced in more intense forms after a year or eighteen months; simple dilation seemed preferable to him, for after the intervention the contraction is never more intense than with catheterization.

As for the question of instruments, he had employed probes partly insulated either circularly or linearly; his electrolysis, circular as well as linear, had failed. For a long time, Dr. Armaignac had restricted himself to the simple or multiple incision of contractions by means of a lachrymotome introduced after dilation of the lachrymal canaliculus by the dilating bivalve speculum of Charriere.

Finally, electrolysis of the canal, according to Dr. Armaignac, may give immediate good results; but though so much more rapid, they are less durable than those which he has obtained by catheterization.

Dr. Lagrange was ignorant of the experiments which Dr. Armaignac had made in electrolysis of the lachrymal passages, these experiments not having been published. With regard to the character of the observations he had related, he remarked that they were all several months old and entirely analogous to those which he had already published. He called attention especially to the electrolytic probe he had presented, furnished with an irreproachable insulating coating, and limiting the action of the current to the nasal canal.

III. REVIEWS OF OPHTHALMOLOGICAL JOURNALS.

Archives Ophtalmology.

Reviewed by Dr. DE BOURGON.

July, 1895.

I.—Contribution to the Study of Œdematous Neuritis of Intracranial Origin, by DR. ROCHON-DUVIGNEAUD.

Two autopsies of cerebral tumors with papillary œdema, hydropisia of the sheaths, and lesions of the optic nerve, form the subject matter of this article.

Case I.—A girl twenty years old. Hemiplegia on the left side. Œdematous papillitis with stasis. At the autopsy, glioma of the right Rolandic region. The optic nerve was atrophied; the maximum lesions were found toward the globe and diminished progressively, yet without ceasing, in ascending toward the fundus of the orbit.

The œdema of the sub-arachnoidal tissue diminished gradually toward the fundus of the orbit, and ceased entirely in the optic canal. The chiasm was more altered than the intra-canalicular region of the optic nerve. The optic bundles showed diffuse alterations. The neuroglia cells were multiplied in the nerve. The papilla was more fibrous, denser and richer in nuclei than ordinarily. The vessels presented in front of the lamina cribrosa, a characteristic *perivasculitis*, which did not exist at the nerve. The veins were affected in the same manner.

Case II.—Young man, twenty-one years old, died of cerebral glioma, having shown with the ophthalmoscope, a double papilliary œdema.

The optic nerve was enlarged, the increase of volume being due to a slight œdema in the neuroglia sheaths, combined with an abundant proliferation of cellular elements, of which the nervous tissue was the seat. The lesions were not systematized, but diffuse. In the papilla, the adventitia of the large vessels was thickened and sclerosed, but this lesion was limited to the papilla, and did not extend beyond the lamina cribrosa. From the critical study of the pathological anatomy of these two observations, the author prefers, instead of the theories of Schmidt-Manz and Deutschmann, the hypothesis of a lymphatic stasis in the nerve and in the brain. Œdema begins at the papilla, and the recto-bulbary sub-arachnoidal space, and ascends along the optic nerve and its sheaths, it may even reach the chiasm, This lymphatic stasis causes, at the region of the papilla, phenomena of blood stasis and of compression, and, eventually, provokes sclerosis of the tissues invaded by the œdema.

The scleral ring, and in a less degree the optic canal, play the rôle of constricting bands. Incisions of the sheath of the optic nerve, but, above all, extensive cerebral drainage procured by trepanning, may cause the disappearance of papillary œdema and, so far as the intra-cranial lesions is curable, free the patient from the danger of the slow sclerosis with which his optic nerves would finally become invaded.

II —**Study of the Rods and Cones in the Region of the Fovea Centralis of the Retina in Man,** by Dr. W. Koster.

When the size of the region exempt from rods is compared with that of the fovea considered as a cavity, the latter is observed to be smaller than the former.

Indeed, the result of the measurement of M. Koster, undertaken with a specially devised apparatus, is that the region in which the

I.—Anatomical Contribution to the Study of the Pathog
pulsive Hemorrhage after the Extraction of Cataract, b
and JACQUES.

Dr. Jacques has studied with care the relations of
arteries to the external coat of the eyeball in their pass
that membrane. He has found that the branches of the
arteries in crossing the sclerotic are enveloped, on al
through the whole length of the passage, by an imper
tioned sheath, establishing a narrow communication l
supra-choroidal space of Schwalbe and the space of Ten
sheath, comparable to that of the vasa vorticosa, cc
new channel, not before described, for the outlet of
lymph.

As for the short ciliary arteries, their walls are very
united to the sclerotic, in such fashion that, if a section
be made at about the middle of its intra-sclerotic passag
nal coat presents barely a few rare disseminated folds, t
is often reduced to a single layer of smooth fibres, the a
totally lacking, and the sclerotic bundles adhere to the
The section of the vessel is irregularly oval, according t
of adherence of its different parts of the wall, and the lu
opening, makes it evident that the muscular contracti
been able to triumph over the rigidity of the sclerotic ga

This anatomical description makes comprehensible the
of hemorrhage following the extraction of cataract, whicl

II.—Contribution to the Study of Suppurations of the Eye and of the Orbit Following Affections of the Neighboring Regions and Cavities, by Dr. VILLARD.

In this article, which emanates from the services of Professor Truc, the author publishes three rare observations.

The first case was one of thrombo-phlebitis of the veins of the right orbit first, and afterwards of the left, *following furuncles of the nose.* At the end of a month the patient, aged three years, died of pyæmia.

In the second, the patient, aged thirteen years, had, following a rather serious angina accompanied with rhinitis, a phlegmon of the internal region of the right orbit. A series of punctures were practised, a drain introduced, and a cure effected.

As there existed a slight deviation of the right eye outward, a double tenotomy of the external recti was practised and the cure was complete.

The bacteriological examination demonstrated the absence of tubercular bacilli.

Finally, in the third observation, the case was one of suppurative irido-choroditis of the right eye, following angina. After euncleation of the eye, the cure was absolute.

III.—Contribution to the Study of Simple Serous Cysts of the Conjunctiva, by Dr. ROGMAN.

Pathological anatomy demonstrates that cysts are formed at the expense of the conjunctiva, an origin which Sæmisch had reserved to the adherent conjunctival vesicles only. This formation is not always caused by grafting, as in the observations published by Uhthoff, for, in several of the cases observed, the persons afflicted were able to affirm in the most formal manner that they had never undergone any traumatism nor suffered any prior ocular affection.

We may believe that certain folds, sinuosities or crypts, so numerous in the conjunctiva, become isolated, pediculated, later strangled, and in the end entirely separated from the membrane which gave them birth, to take the form of cysts and lose themselves in the subconjunctival tissues.

IV.—Paradoxical Form of Scheiner's Experiment, by Dr. PAUL L. REISS.

September.

I.—Malignant Pseudoplasms of the Orbit, by Professor PANAS.

(See ANNALES D'OCULISTIQUE, Vol. CXIV, p. 239.)

II.—Congenital Embryonic Tumor of Mutiple Tissues Nervous and Connective of the Orbit, by Dr. LA GRANGE.

(See ANNALES D'OCULISTIQUE, Vol. CXIII, p. 345.)

III.—**Orbital Tumor With Secondary Invasion of the Sclerotic and Cornea,** by Dr. COPPEZ, Jr.

This tumor was examined by Professor Fuchs, Weichselbaum Gayet, who assigned it to the group of lymphomas. Profes Gayet has published several observations on lymphomatous tumo the eye and the orbit, but with the affection symmetrical, while h it was unilateral.

The child was eight years old. In May, 1894, evisceration of orbit was practised; in August she had veritable cachexia, viol pains in the head supervened, and she had oppression and palpitat of the heart. During four days epileptiform crises supervened, wh disappeared and gave place to profuse diarrohea. Finally, on evening of September 18, she was taken with fever and convulsio and died on the 19th at four o'clock in the afternoon, without possibility of making an autopsy.

From the histological point of view, it is necessary to suppose s ondary penetration of the sclerotic and the cornea, to point out extreme rarity of this localization, to draw attention, finally to presence of a hemorrhage of the optic nerve which, instead of be diffused in the sub-vaginal space, had brought on a rupture of dural sheath.

October.

I.—**Alterations of Macula Lutea,** by Dr. J. P. NUEL. (To Follow.)

II.—**A New Process for Operation in Entropion and Trichiasis,** by LAGLEYZE.

After antisepsis and anaesthesia by cocaine, the process is as f lows:

1. Inversion of the eyelid.
2. Introduction of six needles (two being threaded on the sa thread of silk), introducing them by the conjunctiva in the region the upper edge of the tarsus and withdrawing them through the sl at the line of implantation of the eyelashes.
3. The needles are left without having been passed complet through, in such a way as to keep the eyelid turned back.
4. An incision is made near the ciliary border and parallel to cutting the conjunctiva and the cartilage; it is best to prolong incision beyond the entropion. If the trichiasis or entropion to corrected is not total, only two or four needles should be used inst of the six which are necessary when it is a question of the alterat of the entire border.
5. The operation is terminated by withdrawing the needles

tying the sutures, first the central and afterwards the lateral. The sutures should be properly drawn, so as to provoke a well-marked entropion.

In nine observations in its support, the author affirms, the value of his process, which is recommended by absence of hemorrhage, rapidity and simplicity.

III.—**Contribution to the Study of Endotheliomas of the Orbit** (*Angiosarcomas of Kolaczek*), by Dr. Van Duyse. (To Follow.)

IV.—**On the Equality in size of Retinal Images in Emmetropia and in cases of Corrected Ametropia,** by Dr. Guilloz.

M. Guilloz shows, by geometric construction and elementary algebra, that the spherical glass correcting an auxiliary ametropia will give the ametropic person retinal images equal to those of an emmetropic person, provided it be placed at the anterior focus of the eye, and that this proposition is exact for the vision of distant objects as well as objects near by, the latter being made, thanks to accomodation, through the correcting glass.

V.—**Notes on the Question of Working Glasses,** by Dr. Katz.

Dr. Landolt lately gave a table of presbyopia wholly different from that of Donders; Dr. Katz has found values according neither with those determined by Doaders nor with those established by Dr. Landolt. Here is a memorandum of them:

Age.	Series of Dr. Katz.
40	0.75
45	1.5
50	2
55	2.5
60	3
65	3.25
70	3.50

November.

I.—**Epibulbary Fibroma,** by Drs. Van Duyse and Bribosia.

A case of soft fibroma in which phenomena of stasis and inflammatory irritation had contributed to rapidly increase the volume. It had been developed upon a congenital production.

The excision, accompanied by a copious hemorrhage through the vessels of the base, had not been followed by relapse, three months after the operation.

II.—**Treatment of Simple Glaucoma,** by Dr. Abadie.

(See Annales d'Oculistique, Vol. CXIV, p. 397.)

be able to classify and catalogue with precision the neop
orbital cavity.

The author has examined a tumor of the region of th
mal gland, from a woman fifty-six years old, which had
three months after. The patient died four months later
ness and hemiplegia.

No visceral metastases existed.

If different sections of the tumor are compared, we s
not have a uniform structure. A series of types succeed
alveolar structure, tubular with network arrangement, a
coma at certain points. The structure suggests either t
a true glandular carcinoma (Squirrhe) or that of a cylind
lial carcinoma, or of a tubulated cancroid of Cornil and R
a small-celled sarcoma with dilated capillaries. Careful
these forms shows that the tumor arose from endotheliu
phatic spaces of the connective tissue and in the periv
phatic spaces; it is then an endothelioma of the orbit.

In one case, the fundus of the orbit was the primary
neoplasm and its origin from the periosteum. The his
pearance was that of a fundamental connective tissue
alveolar accumulations, often plexiform of endothelial
to the multiplication of the endothelium of the blood ca

In another case, the tumor was seated in the direct s
optic nerve. It was an endothelioma arising from the
of the lymphatic spaces.

V.—**Two Cases of Interstitial Keratitis not having for cause Hereditary Syphilis,** by Dr. Trantas.

In the first case it was primary, following acquired syphilis, and in the second consecutive to influenza.

VI.—**A Case of Filaria in the Anterior Chamber of a Human Eye,** by Dr. Van Duyes.

This case has already been published in the *Archives d'ophtalmologie* in 1894. Dr. Van Duyse undertook the microscopical examination. He states that it is a *filaria loa* arrived at an incomplete state of development.

December.

I.—**Clinical Observations on the Surgical Treatment of Strabismus,** by Dr. Landolt.

When it is a case of strabismus divergens not paralytic, it follows from observations already published that the preferred process should be the muscular advancement of the two internal recti-muscles.

When one of the eyes is amaurotic or strongly amblyopic, it is necessary to combine muscular advancement with tenotomy. It is the same when the strabismus is paralytic or paretic.

II.—**Genesis of Corectopia,** by Dr. Van Duyes.

When corectopia exists, it must be noted that the anomaly is double, the pupillary displacement being upward and outward; there is besides ectopia of the lens in the opposite direction and myopia. In two observations published by the author are noted, besides, persistent filaments of the pupillary membrane. To explain this combination of anomalies, he supposed a compression of the two ocular vesicles about the fifth week of gestation, in consequence of the momentary narrowness of the cephalic amniotic sac.

III.—**On the Operative Correction of High Degrees of Myopia,** by Dr. Eperon.

If R_1, represents the primary correcting glass of the eye, placed at the anterior focus, R_2 the correcting glass of the aphakic eye at its principal plane, we have

$$R_2 = \frac{1000}{24 + \frac{R_1}{3}} - 32.5 \text{ D}$$

and, simplifying:

$$R_2 = \frac{3000}{72 + R_1} - 32.5 \text{ D}$$

A discussion of the formula shows that with myopia under 20 D the algebraic sum will be positive (formula not simplified), that is to say, R_2 will be positive or convex; the aphakic eye then will be hypermetropic. An eye with primary myopia of 20 D will become emmetropic, according, to this formula, after the removal of its lens. As for eyes with a myopia exceeding 20 D, they will remain slightly myopic after the operation. In effect, the first term will be lower than 32.5 D; R_2, then, will be negative, that is to say, concave.

It must be noted that, to establish that formula, myopia has been considered as due to the elongation of the optical axis of the eye, and the numerical values have been, for the optical axis of the emmetropic eye, 24 millimetres, and the cornea valued as having a radius of curvature of 7.7 millimetres.

The numbers obtained by means of this formula and those obtained empirically by operators accord in the majority of cases and differ very little in the rest.

IV.—**Histological Examination of a Case of Macular Chorio-Retinitis of Hereditary Spyhilitic Origin,** by Dr. ROCHON-DUVIGNEAUD.

Albrecht von Graefe's Archiv fur Ophthalmologie.

Reviewed by Dr. V. MORAX.

Vol. XLI, No. IV.

I.—Investigations into the Color Sense, by Dr. W. KOSTER.

A.—*Distribution of the rods and cones in the fovea.*

The new theories of the color sense are based upon the physiological differences which exist between the fovea; occupied by the cones alone and the peripheral parts of the retina where both perceptive elements, rods and cones are juxtaposed; although it was admitted that the area deprived of rods corresponded to the fovea, up to the present no measurement of its extent had been made The measurements of Koster were made upon human retinæ, examined in t fresh state, less than two hours after death. As Kühne has said, can easily delimit the area of rods and cones under the microsco For this purpose one isolates a portion of the retina including fovea and the optic papilla and examines it on a hollow-ground sli covered with a cover glass. The comparative measurements w made on hardened retina, mounted in celloidin and cut out wit microtoma.

In an infant of two and a half months, Koster found the follow dimensions:

Vertical diameter of the area deprived of rods, 0.828 mm.
Horizontal " " " " " " 0.874 "
Diameter of the fovea, 1.84 mm.

In a second case the area deprived of rods was only 0.44 mm., but in a zone of 0.80 mm. round about it the number of rods was very small in proportion to that of the cones (1 to 15).

In a girl of twenty years, the extent of the area deprived of rods was 0.90 mm.

Many more measurements are evidently necessary, but it may be accepted that in an area of 0.80 mm. the cones play a more important part than the rods, and in the area of 0.5 mm. the cones are the only active elements.

There are also individual differences to which Kühne has already called attention.

B.—*Hypotheses of A. Koenig regarding the function of the visual purple and yellow with relation to color sense.*

Koenig and Ebbinghaus think that the visual purple and decomposition products ought to be considered one of the photochemical substances which gives us one of the fundamental color sensations. Ebbinghaus believes that there is also another substance, green, which gives us the sensation of red-green, while the purple gives the sensation of yellow-blue. Koenig supposes that the transformation of the purple into visual yellow gives the sensation of brightness, while the transformation of the visual yellow gives the fundamental sensation of blue. This author believes that the macula is insensitive to blue. Koster remarks that according to his measurements the region formed by the cones, and destitute of purple represents a visual angle of 3.3°; but Kühne has shown that in the rods of the fovea there is no purple; the region devoid of purple therefore forms an area 1.84 mm. in diameter, corresponding to an angle of 7.2°. At one metre distance a visual angle of 3.3° corresponds to an area of 53 mm., and an angle of 7.20° to an area of 123 mm. But in no normal eye has an area of this extent, blind or less sensitive to colors been observed.

C.—*Theory of J. Von Kries upon the functions of the rods and cones in the human retina.*

The theory of Von Kries is based upon the phenomena of Purkinge and upon spectra of feeble intensity. In his opinion, besides the cones which represent the trichromatic visual system, there is a monochromatic system represented by the rods, giving only sensations of light; the purple, the photo-sensible substance of this system, acts by its accumulation or diminution. That this theory may be satisfactory, it is necessary that the phenomena of Purkinge and the phenomena of spectra of feeble intensity do not occur at the fovea. Von Kries says that he has established this fact, but modifying his experiments. Koster thinks that he has demonstrated that there is no quantitative or qualitative difference between central and peripheral vision with relation to the perception of color and light. Koster remarks that the greater sensibility of the periphery of the retina to stimuli of colorless light shows itself too closely to the point of fixation to be attributed to greater sensibility of the rods to such stimuli. All things considered, the hypothesis of Von Kries, although not diametrically opposed to the results of experiments, offers for the explanation of sensations of color no advantage which can render its adoption desirable.

D.—*Hypothesis of H. Parinaud regarding the functions of the rods, cones, and visual purple.*

Independently of VonKries, Parinaud has promulgated an analogous theory. (We may say, in passing, that Parinaud's conclusions were first formulated in 1881, in a note to the Academy of Sciences.) The same objections may be urged against it, and especially that the differences in sensibility show themselves just at the limits of the macular region, which is devoid of purple.

E.—*The Colorless Spectrum*

Hildebrand and Heinig have shown that when the colors of the spectrum were observed with a non-accommodated eye, such an eye saw them as colorless, but of a much more marked subjective luminous intensity. Repeating these experiments Koster has shown that placing himself in the same conditions the spectrum appeared brighter to him, but always colorless; the colors were no more saturated, but appeared more intense.

II.—**On the Sensibility of the Cornea,** by Dr. KRUCKMANN.

In his researches upon the physiology of sensibility to pain, Von Frey has established some facts of interest in ophthalmology. He concludes that the cornea and conjunction have no sensibility to pressure; that sensibility to pain is distributed over the whole surface of both conjunctiva and cornea, and that the heat sense is limited to the conjunctiva and peripheral parts of the cornea. These physiological observations are in keeping with the anatomical data which we possess relative to the nerve terminations of the conjunction and cornea. Von Frey proceeds as follows :—he fixes a thread or hair, as straight as possible and of a length of 20 to 30 mm, in a holder of wood and applies it perpendicularly to the surface to be examined. Supporting it vertically, a point is soon reached when the hair bends; the pressure exerted is a constant quantity which is easily measured by applying the hair no longer to the eyes, but to one side of a balance and finding the weight which balances the pressure. Determining the diameter of the hair under a microscope, it is always easy to know in grammes and square millimetres the pressure exerted. By using hairs of different thickness one obtains a series of these small instruments running from 10 grammes to a milligramme or less. For the smaller degree of pressure, the hairs of women or children are used.

Krückmann has verified Von Frey's results and extended his investigations to various pathological states of the eye. He used a series of a dozen hairs, which he applied at short intervals, to find the one that gave a sensation of pain.

In young persons the limit of perception averages 0.2 gramme per square millimetre, but the pressure practically employed is from 1 to 2 grammes per millimetre.

With age sensation is blunted; in subjects of fifty years it is often necessary to exceed 1 to 2 grammes per square millimetre to determine a sensation of pain. In glaucoma, the sensibility of the cornea is always diminished, except in simple glaucoma, but it is only a temporary hypoæthesia, for when normal pressure is re-established, after iridictory for example, it is easy to assure one's self that sensation is normal. There are some cases where progressive hypoæsthesia of the cornea may give definite information of the onset of glaucoma, in cases of traumatic cataract, or discision for example.

In almost all affections of the cornea, whatever be the seat of lesion there is a hypoæsthesia at the site of the lesion, while in the healthy parts the limit of sensation is lowered. In herpes ophthalmicas and keratitis vesicneosa, there is established a hpyoæsthesia both at the site of the lesion and in the healthy parts of the cornea.

We can also, by this method, study the action of myotics and mydriatics, since the changes of tension show themselves by an increase or decrease of sensibility to pain. We see also that mydriatics produce an immediate reduction of intraocular tension which lasts from five minutes to an hour and a half, and is followed by an increase of tension which lasts much longer; myotics have an opposite action. Kruckmann has made examinations of corneal sensibility in tabetics; in a certain number of cases there is a hypoæsthesia or an anæsthesia, but in all these cases there is a paraesthesia of the area supplied by the other branches of the trigeminus.

III.—Experimental Glaucoma in the Rabbit and the Role of the Irido-Corneal Angle in Intraocular Pressure, by Dr. CH. F. BEUTZEN (*Laboratory of Prof. Leber.*)

Beutzen sought to obtain secondary glaucoma experimentally in the rabbit. After a number of failures, the report of which has no interest, Beutzen was able to secure adhesion of the periphery of the iris to the cornea and typical secondary glaucomatous disease. The process with which he succeeded most often consists in inserting a blunt needle into the anterior chamber, after puncture with a Graefe's knife, and scraping the whole extent of the irido-corneal angle. It is necessary to make three or four punctures in order to reach the whole circumference of the iris. The increase of tension begins about a half-hour after the operation except in cases where a keratitis develops and keeps the tension below normal for some days; in these cases the increase of tension commences with the resolution of the keratitis.

At the same time there is a hyperæmia of the anterior ciliary vessels and an anæsthesia of the cornea, which persists as long as the tension is raised. In one experiment the tension, measured by Fick's tonometer continued raised for three successive months, during which the observation continued. The disturbances accompanying this increase of tension were the same as those which are observed clinically; atrophy of the iris, compression of the retinal vessels, excavation of the papilla, and atrophy of the fibres of the optic nerve. There also developed an ectasia of the cornea and sclerotic.

After having thus obtained a secondary glaucoma, Bentzen studied in these eyes the filtration of the anterior chamber, following a technique analogous to that which he proposed in his work published in collaboration with Leber, and reviewed in these ANNALES.

He finds that the relation between the filtration in the normal and the glaucomatous eye is on the average from one to three millimetres; the filtration of the anterior chamber is notably suspended in the glaucomatous eye.

IV.—Contribution to the Pathological Anatomy of Inflammatory Glaucoma, by Dr. ED. ZIRM.

Ziem made a histological examination of an eye, the seat of a acute secondary glaucoma in a patient, whose history is as fo lows: A man of twenty-eight years, syphilitic, came to the clin October 30, 1886, for an iridocyclitis of the right eye; a diffu affection of the cornea and aqueous humor with pupillary syn chia; the pupil dilated widely under atropine. November 3d the te sion was markedly increased and there was severe pain. Nove ber 9th complete loss of sight; iridectomy: abundant hemorrhage. November 21st tension normal; diffuse affection of the vitreous with œdema of the papilla, and contour of papilla indistinct. December 2d onset of acute glaucoma with violent pain. Three days later a further increase necessitated enucleation.

We have, therefore, to do with an eye enucleated thirty-four days after the onset of the glaucomatous symptoms, following an iridocyclitis in all probability syphilitic. Microscopically, there is an evident protrusion of the iris and lens. At certain points the choroid is adherent to the sclerotic; in many places it is thickened. In the inferior and external part there is a round yellow spot, at the border of which the choroid and sclerotic are intimately adherent; the pigment is lacking in it and the vessels are not apparent. A slight excavation of the papilla.

The microscopic examination demonstrates various lesions, first of all an adherence of the endothelima of the membrane of Descemet to the iris at the irido-corneal angle. The vessels of the iris are surrounded in places by infiltrations of lencocytes. The ciliary body is swollen. The canal of Schlemm is narrowed and surrounded by round cells. The examination of the different veins shows a very marked infiltration of their walls by leucocytes and considerable diminution of calibre. The sclerotic at this part also shows a cellular infiltration. The extra-scleral parts of the efferent veins are not altered. The different vessels of the choroid are dilated. The choroid is œdematous and contains more cells than in the normal state. The cell infiltrations are particularly marked about the capillaries; some of these are even completely blocked by the leucocytes. The papilla presents the microscopic appearance of a neuritis: cell infiltration, dilation of the central vein, narrowing of the artery. There are some small hemorrhages between the retina and vitreous.

Zirm interprets these lesions thus: The changes of the ureal tract are attributable to an old inflammation, an iridocyclitis, while the recent infiltration of the efferent veins with the resulting venous stenosis and œdema was the cause of the late acute glaucomatous symptoms, which necessited enucleation; in other words, Zirm explains this acute glaucoma by a phlebitis of the efferent veins leading to an intraocular venous statis.

V.—Under what Conditions do Double Images Appear to the Observer to be at Different Distances, by Dr. R. Fröhlich.

Patients having diplopia often voluntarily state that one of the images is nearer than the other The authors who have attempted i explanation of this phenomenon (Von Graefe, Forster, Nagel, anthuer, Sachs) believe that it occurs especially in vertical diplopia id that the inferior image appears to be nearer; but in reality it is et with in horizontal diplopia also. Apart from accommodation, conrgence and binocular vision which permit us to determine the stance of near objects, the determination of the positlon of a stant object rests upon several factors; knowledge of the object and s comparison with known objects in the visual field; the size of the tic image; the perception of the outlines or details of the object, id finally its apparent brightness. Experience has taught us that i object is brighter the nearer it is, and that of two objects of the ime size at the same distance, the brighter appears the nearer.

By the use of prisms it is easy to show that the eccentric image pears the nearer, and this fact is observed both in binocular and onocular vision, when the prism does not cover the middle of the ipil or when, one eye being covered, two objects are placed before e other. This property of the eccentric image, as can easily be perimentally shown, depends upon its apparent greater brightness.

Nagel has shown the influence of surroundings upon the appreciaon of distance. According as the object giving rise to the double iage lies upon a table, below the plane of the eye, or in this plane, near the ceiling of the room, that is to say above the plane of the e, the lower image appears nearer, or in same plane, or more disnt than the upper image. But this important factor of illusion is t unique, for if we suppress all the surroundings of the object, if, r example, we work in an absolutely black room, the illusion still rsists, one of the images still appears nearer than the other. nder these conditions, it is difference in brightness of the two iages due to their central or eccentric perception, which produces e illusion, and not the convergence and accommodation, as Sachs iought.

.—Pathological Anatomy of Scleritis and Episcleritis, by Dr. O. Schirmer.

Schirmer examined two eyes enucleated in the course of a scleritis. he first case was that of a woman of sixty-seven years, without syphitic or rheumatic history, who, in October 1893, presented a primary leritis with iridocyclitis of the left eye, and a secondary affection the cornea. The affection resolved, but returned four months ter: the pain was so violent as to necessitate the enucleation of the lobe. Microscopic examination showed in the cornea, the persisnce of the epithelial coat, but a disappearance of the membrane of owman and the fundamental tissue of the cornea, which was replaced by connective tissue irregularly infiltrated with cells and traversed by numerous blood vessels.

The membrane of Descemet and its epithelium were normal. The iris presented some signs of chronic inflammation. The connective tissue in it was over-abundant. There were many round cells, in parts massed in nodules. The muscular region of the ciliary body presented analogous lesions, but the posterior portion was normal. The retina was normal, the papilla showed only a slight increase of cells. The choroid adjoining the lesions of the sclerotic was the seat of a slight cell infiltration. The episcleral tissue was thickness in its anterior part. This thickening depended mostly upon an œdematous infiltration, for the cell infiltration, was relatively slight and occurred only near the conjunctival epithelium or the superficial layers of the sclerotic. This infiltration existed elsewhere only in the region corresponding to ths ciliary body. The vessels underlying the epithelium over numerous, were dilated, and there were many interstitial hemorrhages as the results of his hyperaemia. The lymphatic vessels were also dilated. The sclerotic is œdematous, its fibres are separated, divided in places into fine fibres. The round cells were abundant. Behind the portion exposed to light, the sclera was normal. In parts where the scleritis had already resolved, there were chiefly degenerative lesions of the sclerotic, the connective tissue strands were atrophied, and transformed into fibres and masses of colloid.

Schirmer concludes that in scleritis there is an œdematous and cellular inflammation of the cornea, followed by a process of degeneration. This scleritis localizes itself in the ciliary region, and appears most marked at the points where the ciliary vessels traverse the sclerotic. It ought to be considered as a direct propagation of the inflammation from the uvea along the vessels. But in this first case deep lesions of the sclerotic accompanied the episcleritis, showing themselves by a violacious infection.

The second case was a boy of fourteen, who, when two and a half years old, had lost the sight of the left eye from a penetrating wound produced by a splinter of wood. This eye became buphthalmic. Five days ago pain developed in the eye. The cornea is the seat of an ulceration, with infiltration of its edges. The anterior segment of the globe is increased in size, and presents a violacious injection. The conjunctival and episcleral vessels are dilated. Enucleation is performed.

Microscopic examination shows the presence of vegetations of aspergillus at the site of ulceration. The cornea is infiltrated and the tissues filled with irregular vascularized tracts of connective tissue. The anterior chamber contains some pus. The iris is atrophic and infiltrated. The ciliary body, retina and choroid, present no trace of recent inflammation, and are the seat only of atrophic lesions.

At the areas of scleritis, the episceral tissue is thickened, owing to an œdematous infiltration and a dilation of the vessels. The fixed cells are no more abundant than in the normal states, but leucocytes are more numerous, especially in the region of the cornea.

Here, as well as in the layers of the cornea, colloid masses, taking the caruin and hæmaltoxylin strongly, are found. The vessels are very abundant and much enlarged. There is little lymphatic dilitation. The sclerotic is the seat of a staphytomatous ectasia, which cannot be attributed to glaucoma; the deep layers are bright, and the connective tissue strands are atrophied and compressed; its superficial layers, on the other hand, are the seat of acute inflammatory lesions, inflammatory œdema, swelling and degeneration of the bundles of connective tissue and cell infiltration.

In the second case Schirmer thinks that the sclero-episcleritis is the result of a corneal lesion.

VII.—Anatomical Examination of a Case of Retinitis Pigmentosa, by Dr. O. Burstenbinder.

Wagermann relies upon the effects of experimental disturbances in the circulation of the choroid of the rabbit, and upon the study of a case of retinitis pigmentosa in a man, to show that the primary lesion of typical retinitis pigmentosa is in the choroid. Meanwhile, he says, it has not been demonstrated that the pathogenic cause does not simultaneously attack the vessels of the retina, but, however that be, the characteristic lesion, the deposit of pigment appears to be due only to a lesion of the choroid vessels. Deutschmann, in a case o retinitis pigmentosa, found the same choroidal lesions as Wageman observed: the nerve elements of the retina had almost complete disappeared; the vessels were occluded and thickened. The pigme was deposited in lines which extended into the retina. The pigm epithelium was either atrophied or hypertrophied. The choroi vessels presented hyaline thickenings of their walls. Deutschma concludes from these observations that the affection was a distu ance of nutrition, due to a sclerosis of the choroidal vessels.

Bürstenbinder has had the opportunity of examining an affected by retinitis pigmentosa. The case was that of a man, six one years of age, who had shown, five years before, an enfeeblem of vision, especially at evening. Slight deafness. No evidence of syphilis. The left eye had to be enucleated as the result of an infected wound ; the right eye showed by the ophthalmoscope some masses of pigment, most abundant in the medium zone of the eye ; the changes were absent from the periphery. They led to functional annular scotoma. Vision was reducd to ⅓.

The histological lesions of the enucleated eye do not involve the whole of the retina ; while in the peripheral and central parts of the perceptive elements, both rods and cones are well preserved, in the median part the nerve elements have entirely disappeared. The external layer of cells is absent, while the internal layer and that of the nerve fibres is normal. The pigment masses originate in the pigment epithelium, penetrating the retinal layers and even the walls of the obliterated vessels. Topographically, the changes in the choroid corresponds exactly to those of the retina. The choroid is thickened in places ; the vessels are narrowed ; at some points the choroid capillaries are absent. There is, moreover, a marked infiltration of leucocytes. If Wagermann did not observe this cell infiltration, the evidence of an inflammatory process, it was because in his case the affection was an old one, while in Bürstenbinder's case the lesions were still in process of evolution.

VIII.—On the Production of Cystic Cavities in the Retina, by Dr. F. Falchi.

Falchi describes at length small cystic cavities developed in the substance of the retina in two patients. In both cases there was a total detachment of the retina, and although Falchi thinks that the detachment was secondary to the cystic formations, it appears more probable, in view of the antecedents, that the degenerative changes were the results of the detachment. In both cases, moreover, the detachment was complicated by a plastic iridocyclitis and glaucomatous symptoms. The anatomical study of all these lesions, although conscientiously made, has thrown no light on the pathology or etiology of the affection.

IX.—On Periodic Fugacious Episcleritis, by Dr. E. Fuchs.

Prof. Fuchs publishes twenty-two observations of the affection which he has described under the above name, and which corresponds to that which Graefe designated sub-conjunctivitis or partial anterior tenonitis.

Hutchinson, Nettleship and Swan M. Burnett have observed cases of this affection, which appear rather infrequent.

It is a frequently recurring inflammation which attacks the bulbar conjunctiva and especially the subjacent epithelial tissue. There is a the tissues filled with irregular vascularized tracts of connective tissue. The anterior chamber contains some pus. The iris is atrophic and infiltrated. The ciliary body, retina and choroid, present no trace of recent inflammation, and are the seat only of atrophic lesions.

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It is a frequently recurring inflammation which attacks the bulbar conjunctiva and especially the subjacent epithelial tissue. There is a deep injection of violet color, and often a very marked tumefaction of the affected region.

But there is no catarrhal conjunctivitis and none of the infiltration of episcleritis. It is rather an inflammatory œdema than an inflammation with exudation. It is only in the very severe cases that the nflammation completely surrounds the cornea: as a rule it localises tself in one part and can pass from one point to another or to the opposite eye in a few days. The parts not involved are not injected which readily distinguishes this affection from cartarrhal ophthalmia. In ordinary episcleritis, which also recurs, but not often, there are irm inflammatory nodules which persist for weeks, and which often leave behind them colored spots upon the sclerotic. Nothing parallel is seen in periodic episcleritis which disappears very rapidly and leaves no traces. In some cases there are observed analogous nodules, but they disappear rapidly. Periodic episcleritis attacks both eyes successively, often in a very regular way, or simultaneously. It may affect one eye alone.

The inflammation is accompanied by symptoms of irritation, pain, lachrymation, and photophobia. These are often slight, at other times more distinct. Very frequently the affected region is very sensitive to palpation through the eyelid. When the pain is violent, it may assume a neuralgic character and radiate about the eye. It may cause insomnia and prevent work.

As a rule the pain precedes the external evidences of episcleritis. It often disappears with the appearance of the redness, and in all cases subsides before it: exceptionally the pain sets in with the redness

Besides the features which belong to all cases, we find in some, a rather marked palpebral œdema with swelling of the preauricular gland. In two observations the cornea presented small punctiform infiltrations. The iris is often congested; the hyperaemia of the ciliary body leads in a certain number of cases to distress in accommodation, with or without spasm of accommodation. The duration of the affection varies from one to six or seven days. Exceptionally, when this affection returns only once or twice in a year, the attack may last four weeks. The recurrences are constant and in many cases the intervals between them do not exceed two to four weeks. As to the ultimate duration of the disease, it has varied from one to twenty years in eight of the twenty-two cases. In eight others it still persists after from seven to ten years. In six cases it has been impossible to obtain information on this point.

As to the etiology of the affection, Fuchs has noted that it attacks men more often than women (15 to 7 women), and adults from twenty to fifty years. It seems very often to be a disturbance of nutrition. Hutchinson and Nettleship considered the affection to be of a gouty nature. The larger part of the patients examined came from private practice and in general were persons of full habit, but none of them gave typical gouty symptoms or had an increase of uric acid in the urine. Vegetable diet and alkaline waters almost always caused an amelioration but never led to cure, In one case only the patient had had two attacks of articular rheumatism. Three times the affection appeared to be due to malaria; quinine prevented or stopped an attack. Fuchs has found no relation to migraine, menstruation or urticaria. As to the exciting causes of an attack, it has in most cases been impossible to determine them. In some cases, however, there appeared to be a relation between local exposure to cold and an attack. The long persistence of the recurrences is proof that treatment is often without effect. Quinine and salicylate of soda appear to be the best practice. Their prolonged administration appeared, in some cases to have put an end to the attacks.

X.—**Response to Dr. Oswalt,** by Dr. Koster.

XI.—**Critical Observations on the Question of the Existence of Simple Accommodation,** by Dr. Hess.

Vol. XLI., No. I.

I.—**Contribution to the Pathological Anatomy and Bacteriology of Suppurative Keratitis in Man,** by Drs. W. Uhthoff and Th. Axenfeld.

The question of corneal infections in man has been the object of much study, but it must be recognized that instead of simplifying or making clearer the problem of corneal ulcerations, these researches have only added to the confusion. In most cases their authors have been guided by purely theoretical considerations and have forgotten that in the study of a question of human pathology, it is necessary to employ every available means of investigation and observation, and that bacteriology or experiment alone cannot supply that which only clinical observations can make clear. The memoir of Uhthoff and Axenfeld is the more interesting because the question of suppurative keratitis is viewed from all three standpoints of clinical, pathogical, and bacteriological inquiry, and, that their conclusions are reached from the conscientious study of fifty cases. Clinically many varieties of suppurative keratitis can be distinguished. The serpiginous ulceration which constitutes the most frequent variety is characterized by the development of an ulceration which spreads over the surface of the cornea. The extension shows itself at one side, and while that side shows a distinct purulent infiltration, the opposite side is being recovered by epithelium and is tending to cicatrization. Perforation occurs only when the ulceration has attacked an extensive surface. There is always hypopyon.

Besides this variety there is a keratitis with hypopyon, in which the ulceration does not extend superficially, but on the contrary tends to penetrate into the substance of the cornea. These ulcerations are in general deep, crater-like.

They very rapidly lead to perforation.

In the cases of keratomatocia, which resemble this variety, the ulceration occurs by preference in the part of the cornea corresponding to the palpebral aperture. The necrosis of corneal tissue is very rapid.

Besides these clinical varieties Uhthoff and Axenfeld have studied one case of keratomycosis, and two cases of panophthalmia following the infection of a long-standing adherent leucoma.

To what varieties of infection do these clinical distinctious correspond? What relation does the infectious agent bear to the clinical aspect of the disease?

To these questions the microscopic examination of pus from the corneal ulcers and cultures give the following definite reply:

The serpiginous ulcer is caused by the pneumococcus. In 35 cases of serpiginous ulceration the pneumococcus was found in 29 (24 times alone, while in 5 cases besides abundant colonies of the pneumococcus there were colonies of staphylococci or a clubbed bacillus). In the 6 cases in which the pneumococcus was not in evidence, the negative result could be attributed to the gelatine employed, its reaction being too alkaline, in which case it is said the pneumococcus does not develop.

It is to be remarked that in serpiginous ulceration the pneumococcus shows little tendency to association with other microbes, and that, even four weeks after the onset of the process, the pneumococcus still existed in a pure state. (It is well understood that to inoculate pus from the base of an ulcer, it is necessary to first employ lavage of the cornea and conjunctiva, with a jet of sterilized water.)

In a case where the bacillus of ozama existed in abundance in the conjunctival sac, the pneumococcus alone was found in the corneal ulcer.

The pneumococcus was also found in pure culture in the beginning of the two cases of panophthalmia in the eyes, the seat of adherent leucoma of the cornea.

In keratitis with hypopyon the bacteriological examination twice demonstrated the staphylococcus, twice a bacillus not described, once the bacillus pyogenes fœtidus, and thrice the streptococcus.

In two cases of keratomotacia in athreptic children, the streptococcus was found in pure culture in the pus of the ulceration.

In a general way, it can be affirmed that in the cases of ulcer of the cornea which do not present the clinical type of the serpiginous ulcer, the pneumococcus is not the active pathogenic agent.

The bacteriological examination of a number of cases of keratitis, superficial vascular or avascular, dendriform, phlyctenular, parenchymatous, and also of the ulcers of spring catarrh and rodent ulcers, has never demonstrated the pneumococcus. The authors have sought to determine the question of the presence of the pneumococcus in the conjunctival culs-de-sac in both the normal and pathological condition. Gasparini asserts that he found it in 28 out of 30 trials in the normal culs-de-cac, but his bacteriological technique was not above criticism. Uhthoff and Axenfeld met with it only exceptionally in the healthy conjunctiva. On the other hand, in the cases of serpiginous ulceration, it is often present in the culs-de-sac. They have also demonstrated the pneumococcus in two epidemics of conjunctivitis. The bacteriological exammination of hypopyon has been negative in almost all cases. When perforation occurs, micro-organisms can be found in the pus of the anterior chamber, but not constantly.

With regard to the histological lesions observed, they have been of very secondary interest to the bacteriological findings.

In serpiginous ulcers the loss of substance is superficial, it is limited on one side by a zone of cell infiltration, and on the other by a zone of regeneration of epithelium. The parenchyma of the cornea presents a more or less marked degree of œdema with dilation of the nutrient canals. The fixed cells are swollen and there is an infiltration of leucocytes. At times there is even a fibrinous exudate between the layers of the cornea. The infiltration of leucocytes is diffuse, but is not perfectly round as in keratitis from inoculation. The membrane of Bowman disappears very rapidly and is lacking over the whole extent of the ulceration. The desqumation of the cornea epithelium is more extensive than the ulcer itself. As to the membrane of Descemet, it remains intact unless perforation takes place. The epithelium of Descemet is raised in places, even in cases where the membrane is preserved. Often there is an infiltration of cells between the epithelium and the membrane.

Hypopyon consists of a fibrino-purulent exudate.

In the cases of keratomolacia the cell infiltration existed only in

the inferior half of the cornea, while the other regions of the cornea were almost wholly spared.

The pneumococcus, isolated in five cases of serpiginous ulceration, presented the usual characters of this organism. Its virulence was variable; it kills the animal (mouse or rabbit) sometimes from local lesions, sometimes from septicæmia. In no case did death result after inoculation upon the cornea of the rabbit.

Uhthoff and Axenfeld think that they can explain the peculiar evolution of the corneal process in serpiginous ulceration from the fact that the pneumococcus is destroyed very quickly by the products.[1]

The lesions which they obtain in the rabbit do not show the peculiar evolution of the serpiginous ulcer. The infiltration develops in forty-eight hours and is accompanied with hypopyon. It never leads to perforation or panophthalmia. The bacteriological examination of hypopyon in rabbits has always given negative results.

It is interesting to know the source of the pathogenic microbes in infectious keratitis. The frequency of the disease of the lachrymal passages and ozæna in the cases studied by Uhthoff and Axenfeld (40 per cent. of lachrymal affections, 20 per cent. of ozæna) leads them to think that the pneumococcus comes from the nose, where it is said to exist very frequently in the normal state. The micro-organisms of the nose appear to be able to pass into the lachrymal sac in the absence of stricture of the lachrymal passages. The origin of the streptococcus or staphylococcus can be explained by the presence of these organisms upon the conjunctiva either healthy or diseased.

Uhthoff and Axenfeld conclude their memoirs by reporting a case of keratomycosis, observed in a girl of eight years, into whose eye some bits of earth had fallen, and who showed ocular lesions as early as the following day; three days later there was a yellowish white infiltration simulating an abcess of the cornea, but without definite ulceration of the surface of this membrane. There was hypopyon and a slight iritis. Puncture with a paracentesis needle gave exit to the yellowish-white mass. It formed a compact mass, which under the microscope appeared to be composed of a tangle of branched mycelial threads, without color. Culture upon serum produced, after

several days, colonies having the character of aspergillus fumigatus. Inoculation on a rabbit showed that this aspergillus was pathogenic. Some days after the removal of the mycelial sequestrum, there was complete healing.

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From this long and important study Uhthoff and Axenfeld conclude that with reference to etiology and clinical features they can distinguish the following groups of keratitis:

Keratomycosis due to the aspergillus.

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II.—**A Case of Keratomycosis,** by Dr. O. SCHIRMER.

Since the case published by Leber, in 1879, Uhthoff, Fuchs and Axenfeld have each reported an observation of this affection. The case of Schirmer is that of a boy of fourteen years, who, when two years of age, received a wound of the eye; this eye became ophthalmic and blind. Upon this eye there had developed without cause, which investigation could show, a corneal ulceration of the size of a pea, seated a little below the centre of the cornea, its base and edges having a yellowish color and a dry appearance. The opacity of the cornea did not permit the determination of the presence of hypopyon. There was a very active infection of the conjunctiva and episcleral tissue. Inoculation was practised, and the anatomical examination showed in the ulceration the presence of mycilial filaments, recalling those of aspergillus. These filaments occupied the substance of the cornea, but reached the membrane of Descemet only at the centre of the ulceration. At one point they even penetrated into the anterior chamber, but remained near the posterior wall of the cornea. These filaments, stained by Weigert's method and by haemotoxylin. Cultures were not made, and he was therefore unable to determine with what species of mycosis he had to deal.

III.—**Accommodation and Convergence in Oblique Vision,** by Dr. W. KOSTER.

Here are the conclusions of this memoir:

1. In oblique vision, the two eyes accommodate equally, and the degree of accommodation corresponds to the distance of the object fixed from the eye of the same side.

2. The convergence of the lines of vision is less than in median vision, and becomes still less as the obliquity of vision is increased.

3. To pass from a position of median convergence to one of oblique

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convergence, the accommodation remains the same, but the eye nearer the object fixed must execute a greater angular excursion than the more distant eye.

4. The punctum proximum for binocular accommodation recedes as soon as the angle of the lateral vision exceeds 20°, and the recession increases as the obliquity becomes more marked; it is the same the greater the degree of convergence.

5. The statements made in the preceding propositions can be explained by a relative and absolute insufficiency of convergence, due to the greater mechanical resistence to lateral displacement of the more distant eye.

IV.—On the Dissemination of Sarcoma of the Uveal Tract, by Dr. Th. Ewetzky.

Virchow explains the generalization of tumors by a sort of dissemination of some elements of the primary tumor. In ocular pathology, the fact is well known for glioma of the retina; it is admitted that some elements become detached from the surface of primary tumor and at a distance form secondary nodules. The conditions of multiple sarcoma of the uveal tract make one think the genesis of the secondary tumors analogous. But Mitvalsky, in a study which he made of two cases of sarcoma of the uveal tract, has given another explanation.

He has demonstrated a sarcomatous degeneration of the pigment epithelium between the primitive aud secondary tumors, establishing lines of connection between them and showing that the secondary tumors are not produced by dissemination, but by propagation in continuity.

Ewetzky describes at great length a case of milanosarcoma of the iris with propagation into the ciliary body and the choroid, and a second case of diffuse milanosarcoma of the choroid.

In both cases he has demonstrated pigment cells in the vitreous. These pigmented cells springing from the tumor and extending into the vitreous and other tissues of the eye, by reason of their mobility and their vital energy, can become points of departure for secondary foci. Ewetzky thinks that he has demonstrated the dissemination of the neoplastic elements of sarcoma of the uveal tract.

V.—On the Coexistence of Optic Neuritis with Acute Myelitis, by Dr. Katz.

Katz publishes the following observations, gathered at the clinic in Heidelberg:

A woman of fifty-six years, no clear evidence of syphilis, one miscarriage.

On February 10, 1894, after exposure to cold, a sense of oppression in the head and disturbance of vision. Three days later there was a slight double optic neuritis; the papillæ were red, their outlines a little indistinct; there was a slight venous stasis; $V=OD\frac{6}{18}$, $OS=\frac{6}{36}$. February 16th, the visual disturbance had increased $V=OD\frac{6}{35}$: OS, counts fingers at 3 metres. The ophthalmoscopic lesions were very distinct; the optic neuritis was more characteristic; the papillæ were prominent, the veins dilated and sinuous. On the twentieth, the amaurosis was complete on both sides. Following this, paresthesia developed. Sudden right hemianæsthesia; four days later a paralysis of the left leg with retention of urine and faeces, also a marked feebleness of the left arm, while the limbs of the right side preserved some movement. The patellar reflexes were absent on both sides.

February 28th, sixteen days after the onset, there was a complete paraplegia with anæsthesia, analgesia, and partial thermo-anæsthesia. The zone of anæsthesia rose to the breasts.

During the evolution of these symptoms, the temperature, at first a little elevated, remained normal.

An attack of acute cystitis developed, and a little later a pneumonic focus in left lower lobe. The urine contained a trace of albumen, no blood, sugar, or casts. An ulceration developed over the sacrum. The amaurosis which was complete on February 19th, persisted till the 8th of March. At that time a partial return of vision took place.

There was on the right, a central scotoma without peripheral contraction of the visual field. The patient could hardly count the fingers. On the left, the visual field was normal; there was no scotoma; the fingers could be counted at 2 metres. Pupillary reactions normal. Atrophic decolorization of both papillæ with narrowing of the arteries on the left side. September 22, 1894. Persistence of paraplegra with anæsthesia. No improvement in vision.

Death occurred in March, 1895. The autopsy showed a disseminated spinal myelitis and an atrophy of the chiasm and optic nerves; the cerebrum, medulla, and cerebellum normal.

The microscopic examination of the optic nerve showed characteristic lesions of atrophy. The nerve sheathes stain poorly when they are preserved. The nerve fibres are altogether converted into a fibrous mass. The connective tissue septa are thickened. The walls of the vessels show no distinct sign of inflammation, either old or recent. Katz regards it as a case of a spontaneous myelitis, accompanied by optic neuritis.

From twenty-one analogous cases which he has found scattered through medical literature, he draws the following picture of the affection.

Very suddenly, often without direct external cause, and in complete health, there occurs a rapid loss of vision in one or both eyes. Both eyes may be affected at the same time, or some time may elapse between the invasion of the two nerves; at times the second eye is not affected, when the first is in process of amelioration. In thirteen cases there was intense pain in the temple or orbit, preceding and accompanying the visual trouble. Often there was pain to pressure upon the globe; even the motions of the eye may be painful. On the other hand, the eyes give no evidence of external disease. Twice only was any affection of the other cranial nerves noted: paresis of external and internal oculo-motors, with participation of the facial and hypoglossal in one case, in the other paresis of elevation.

The loss of vision develops so rapidly that in some cases the amaurosis is quite complete in twenty-four hours; or this may occur only after some days.

In two cases, the loss of vision was most marked after from five to nine months. Information concerning the visual field and the chromatic sense are most often lacking, owing to the fact that the blindness attacks the whole visual field.

In four cases there was central scotoma. Seven times there was noted either in the beginning or in the course of the affection color disturbances, affecting particularly the green and red.

To the ophthalmoscope, there is, in the beginning, some hyperæmia with more or less marked prominence of the papilla But not every ophthalmoscopic picture is characteristic, and the fundus of the eye may even appear normal. Only twice has a slight participation of the retina been observed.

In 19 cases the affection was bilateral and blindness occurred in 26 eyes. In 4 cases one eye was amaurotic, while in the other vision was not entirely lost. In 4 cases there was only slight visual disturbance in both eyes. In one case opthalmoscopic disease existed in both eyes, while functionally only one was affected. Once a bilateral ophthalmoscopic lesion was accompanied by no functional disturbance.

In general, the pupils are dilated after the amaurosis. After the visual disturbance has persisted for a variable time, the duration of which varies from 4 to 26 days, there is always an improvement; but only in a few cases is this followed by a complete return of vision.

Nine times atrophy was seen to follow the optic neuritis. Nine times death occurred before the atrophy had had time to develop.

In 2 cases the neuritis resolved, leaving no traces. Regarding the symptoms of myelitis: These are very variable, but the usual localization is in the dorso-lumbar portion of the cord. In 15 cases the neuritis preceded the cord symptoms from 3 days to 5 months. Five times the visual and spinal symptoms appeared simultaneously. Once the optic neuritis developed 4 to 5 weeks after the myelitis. Both affections always have an acute or subacute character.

The spinal lesions consist of disseminated foci of myelitis, irregularly distributed in the different segments of the cord; the vessels are dilated and the perivascular spaces filled with round cells. There are, moreover, in the nerve substance many leucocytes and granular cells. These changes are identical with those of the optic nerves and plead in favor of the same pathogenic cause, producing the changes in the cord and optic nerves.

As to the nature of the pathogenic cause, the observations give little information, apart from the common causes. Exposure to cold and overwork. There was no syphilitic history in 10 cases, where this was sought for. In 5 cases the patient had had syphilis. In 56 other observations the authors give no information on this point.

In one case, the patient had had a suppurative angina 3 weeks before the onset of nervous symptoms. In another the visual affection appeared in the course of an attack of influenza.

Katz shows, however, that no conclusion can be drawn, and that many more observations are still required to establish the etiology of these optico-medullary symptoms.

VI.—Experimental Studies and Critical Considerations on Sympathetic Ophthalima, by Dr. L. Bach.

Bach thus sums up the conclusions of his memoirs: Many experiments made with staphylococci of varying virulence, with pneumococci, and tubercle bacilli, have shown that the transmission of these microbes from one eye to the other along the sheath of the optic nerve does not occur in such a way as to support the theory of migration.

The bacteriological examination of many globes or optic nerves removed in the course of a beginning or threatening sympathetic ophthalima has always given negative results. After resection of a portion of the optic nerve, restoration of communication between the central and peripheral ends of the cut nerve have never been observed, as supposed by advocates of the theory of migration to explain the inefficacy of section or resection of the optic nerve. If the theory of migration is sound, we ought to see sympathetic ophthalmia more often follow panophthalmia; the objections of Deutschmann and Schirmer are of no value.

The hypothesis that the micro-organism of sympathetic ophthalmi cannot be demonstrated by our technique or our media lacks foundation. On the theory of migration one cannot understand the primar development of the affection in the uveal tract. The course of th appearance of sympathetic lesions is also irreconcilable with the theor of migration. A migratory ophthalmia such as Deutschman regard it, ought to be attended by meningitis. In various irritations of th ciliary nerve, one sees in a very short time microscopic and chemica changes, which Bach considers the beginning of inflammation, developed in the opposite eye. They do not, however, present the typica appearance of sympathetic ophthalmia.

The transmission of an irritation of one eye to the other takes plac through the ciliary nerves; directly through the vassomotor nerves c the circle of Willis, indirectly through irritation in the medulla It is proper to retain the term sympathetic ophthalmia.

The experimental facts adduced by Deutschmann in support of hi theory cannot withstand criticism and all those, who have repeate his experiments after him, have affirmed the weakness of his arguments; if the theory of migration has continued to find advocates it is due in part to its attractive form, in part to the need of havin an explanation, even erroneous, of all that escapes our comprehension From the standpoint of experiment, both adversaries and advocates o the theory of migration find themselves altogether in the domain o supposition. It would be simpler to acknowledge that the patholog of sympathetic ophthalmia is not yet established and to view th facts without prejudice. To the theory of Deutschmann, Bach opposes the theory of irritation of the ciliary nerves. Some fact adduced in support of this theory are of interest. Without wishin to give them an importance which they do not possess, it appears t me proper to call attention to them.

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It does not appear that the nature of the irritation has any influence upon the production of these changes; it is necessary only that the irritation be painful. The different methods of experimental irritation employed by Bach have been :—

1. Painting the cornea and iris with solutions of sublimate $\frac{1}{1000}$ or $\frac{1}{2000}$. If stronger solutions were used, they produced anæsthesia and the effect upon the opposite eye failed.
2. Irritation of the cornea with the Faradic brush.
3. Mechanical irritation with or without perforation of the globe.
4. Irritation of the cornea, ulcerated twenty-four hours before.
5. The introduction of nitrate of silver into the cornea

The cornea was irritated by one of these processes for thirty minutes or an hour, the animal then anæsthetized with chloroform or ether, and the eye of the other side enucleated. The experiments were conducted upon cats, rabbits and pigeons. In control experiments Bach never found analogous lesions.

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VII.—**A Case of Dacryops,** by Dr. V. FRANCKE.

Cases of dacryops, that is cystic dililation of one of the excretory ducts of the lachrymal gland are very rare; Francke has found only 13 in literature. The case which he reports is that of a woman of 42 years, who presented a small round tumor, the size of a pea, mobile, seated upon the conjunctiva a little internal to the external palpebral angle. Extirpation through the conjunction. The wall of the cyst was lined with a simple endothelium and this wall itself had a thickness of three-quarters of a millimeter. This cystic dilation appeared to be developed as the result of the obliteration of the orifice of one of the excretory ducts by a conjunctival cicatrix.

The hypothesis that the micro-organism of sympathetic ophthalm cannot be demonstrated by our technique or our media lacks found tion. On the theory of migration one cannot understand the primai development of the affection in the uveal tract. The course of tl appearance of sympathetic lesions is also irreconcilable with the theoı of migration. A migratory ophthalmia such as Deutschman regar it, ought to be attended by meningitis. In various irritations of tl ciliary nerve, one sees in a very short time microscopic and chemic changes, which Bach considers the beginning of inflammation, deve oped in the opposite eye. They do not, however, present the typic appearance of sympathetic ophthalmia.

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VIII.—**Researches upon the Subject of Accommodation,** by DR. C. HESS

Some new observations on the mechanism of accommodation According to the theories of Schoen and Tscherning it is supposed that the increase of the curvature of the lens in accommodation is due to an increased tension in the zonule, while, according to Helmholtz's theory, this effect is produced by a relaxation of the zonule.

Hess has sought to understand the changes that occur in the lens and zonule by studying them in patients in whom an iridectomy allowed him to accurately observe the edge of the lens and the ciliary processes by the use of the binocular magnifying-glass of Von Zehender. He studied them under the action of both eserine and atropine.

Under the influence of eserine, the ciliary processes project before and to the inner side of the edge of the lens. One can see them push themselves before the equator of the lens. The distance between the ciliary processes and the edge of the lens becomes considerably less in old persons under the influence of eserine. The fibres of the zonule, which in the atropined eye present the appearance of straight, dark lines, are no longer distinct in the eye treated with eserine. Under this same influence the margin of the lens becomes more regular and distinct, while in the atropined eye the contour is slightly undulating. The same is true of the equatorial projections or depressions on the anterior surface of the lens, which also becomes invisible under the influence of eserine. The lens, which is always immobile in an eye not affected by eserine, presents after the instillation of eserine a vibration, often remarkable, which disappears when the action of the eserine is spent.

Comparing the action of eserine to that of the ciliary muscle, Hess concludes that the theory of Helmholtz is legitimate. The fact observed, that the ciliary processes project before the equator of the lens, disproves the theory of Schoen and Tscherning, which supposes a contraction of the ciliary processes toward the vitreous body.

IV.—BOOK REVIEWS.

BOOKS AND THESES.

Nouveaux Elements d'Ophtalmologie, by Drs. H. Truc and E. Valude. (Maloine *Paris*, 1896.)

Some courage was required on the part of the authors in presenting their *Nouveaux Éléments*, so recently after the admirable manual of Fuchs, which has been translated into various languages, and which has won for itself a foremost place among works of its kind, both by its excellence and its simplicity. But beyond the fact that several chapters are treated in a manner too concise, for example, that on refraction, it is readily seen that the work of the eminent Vienna professor is constructed on traditional lines, in which for each part of the organ of vision are given separately the anatomy, physiology, pathology and therapeutics, a plan which destroys the didactic unity which characterizes the other method of treating the subject, that of regarding the organ of vision as that of a special sense in which the various parts of which it is composed participate in such a manner as to become factors of the general system.

This is the thought that has guided the authors in the arrangement of their treatise.

The originality of the plan adopted would rather justify; this title *Éléments d'Ophtalmologie exposés selon une méthod nouvelle.*

After a short but complete historic sketch of the science of ophthalmology, the authors break from the routine and give us the complete anatomical description of the apparatus of vision from the orbit to the sensory centre, its comparative anatomy so far in the animal scale as serves from the anthropologic point of view, and finally the embryological development. The physiology is then discussed in its many phases. This manner of arrangement has the great advantage of permitting the authors to combine in complete union the general pathology and therapeutics of the visual organ, facilitating their task when they come more in detail to special pathology and therapeutics. Thanks to the authors, ophthalmology is made to appear that which in reality it is, a simple but an important branch of medical science. We may add that in the chapters relating to the function of the organ the authors have not thought it necessary to be too concise.

The first part has already appeared and the second will speedily follow.

Since the two volumes are complimentary to each other it is necessary to defer the analysis of the work. We content ourselves for the present with transcribing the preface of the book:

" *The Nouveaux Éléments d'Ophtalmologie* represents not so much "a treatise as a book of first lessons and we would gladly say of in-"structions.

"The plan is in this respect peculiar.

"The anatomy, physiology, examination of the eye, refraction, "ophthalmoscopy, general and special pathology and therepeutics "form so many separate parts which may be studied progressively or "separately consulted. Moreover, the elementary symptoms and their "semeology, the relations of ocular affections with general diseases, "the tubercular, lymphatic, leprous, syphilitic, rheumatic, and gouty "ophthalmias, etc., also occupy a distinct place; in like manner "similar morbid elements, tumors, wounds, hemorrhages, congenital "states, etc., are grouped in a way to be understood in their *ensemble*, "and furnish broad, general facts. Therapeutics is divided into "medical and surgical. Finally the applications to hygiene, to legal "medicine, to the schools, to the professions, to the army, and to the "marine are indicated in special chapters.

"A number of subjects generally little studied in the text-books "have been eliminated; they have been replaced by a general and "special history of ophthalmology, anthropology, comparative an-"atomy, ocular expression and æsthetics, histology, bacteriology, "technique, gunshot wounds, veterinary pathology, climatic treat-"ment of diseases, medical and surgical hygiene, the nomenclature of "blind asylums, general bibliography, etc. These questions may "perhaps interest beginners and possibly some of our colleagues.

"We have not hesitated to return to frequent repetitions upon the "same subject, thus conforming to the spirit of our work. The same "ideas, regarded from different standpoints are more easily retained. "These repetitions, usually inadmissable, will be here, probably, of "some use. Our purpose, in fact, has been, to combine in a single "work that which has been written in different books, and to supply "the instructions necessary for our specialty, and to present a kind of "introduction to clinical work and to the great treatises; to respond "in fact to the existing necessities of private and public instruction.

"Numerous diagrams facilitate the understanding of difficult "questions and the descriptions of instruments and of operative pro-"cedures."—VAN D. B.

Account of the Semi-Centennial Jubilee of the Asylum for the Blind at Lausanne. (*Lausanne*, Coriar et Cei.)

The Asylum for the Blind at Lausanne is more than its name would suggest. From the foundation, in 1844, of this philanthropic institution, created and maintained exclusively by the munificence of generous donors, it has comprised, beside the asylum, a blind school, a hospital, and an ophthalmic clinic. A printing-house was soon added to the different studios, serving for professional education.

The history of the Asylum for the Blind at Lausanne, furnishes a conspicuous example of the power of well-directed private initiative, and shows, beside, that private institutions are protected from the abuses which only too often stain public charitable institutions. But this is not the place to go deeply into a subject of political economy, especially as the account of the semi-centennial jubilee of the asylum at Lausanne contains communications of high scientific interest.

The communication of M. Bernus, professor at the Institution for the Young Blind of Paris, entitled: "On the prejudice of the seeing against the blind, and that of the blind against the seeing," contains a series of most interesting facts and observations. It teaches us the existence of the pride of caste among the blind in an indubitable fashion.

Dr. Aug. Dufour, in speaking of "ophthalmology and its progress during fifty years," has known how to interest the great public in our art.

We pass by the special communications concerning the means of education and work for the blind, to stop at the "physiological study on blindness," by Dr. Marc. Dufour. The eminent physician at the head of the ophthalmological hospital of Lausanne, is an observer of the first order. He shows to what extent and in what manner the senses of hearing and touch supply the place of sight in those born blind, or who have become blind before a certain age. Many personal observations support the affirmation of the author, that the young blind person of normal type, that is to say, having the physical and intellectual equivalents of a child in good health, minus the function of sight, comes to direct himself almost as well as one who sees, to put in practice most of the games of children, to walk on a wall, to play at tennis, to run after a hoop, striking it with his stick, to play marbles and to know which is the marble struck and which is the loser.

Children who have become blind after affections of the nervous system usually present much more extended deficiencies than that

constituted by the loss of sight. Their development is found to be fettered by this fact, and this is observed especially among the meningitic.

"What is the channel of that perception by which the blind man perceives the proximity of a house, which is 15 or 20 metres in front of him?" We may reply in the most positive fashion that it is by means of hearing that the blind man acquires a relatively distinct knowledge of what surrounds him. The noise of footsteps on the ground or the flag-stones, the noise of a stick or umbrella striking the earth, or even the noise of clapping hands, undergo modifications according to the objects which, placed about us, interrupt the sound waves and reflect others, which, returning to our ears, augment and modify the sound.

"It is doubtful, then, that the normal blind man who has been able to develop his auditory centres during the years of his youth, appreciates better slight differences of sound, and can draw more just conclusions from them as to the nature of the space in which he finds himself."

In a second communication, Dr. Marc. Dufour speaks "of the variation of causes for blindness." For reasons of fact this study must be limited to the young blind pupils of the institutes. The notes of the asylums of Munich and Lausanne allow comparative study for a period of fifty years. Congenital affections of the eyes present only fortuitous variations in the production of blindness. Their part comprehends successively 24 per cent., 15 per cent., 13 per cent., 25 per cent. of the number of the blind for each of the decennial periods comprised between 1844 and 1894. In ophthalmia of the new-born, the corresponding numbers show a marked decrease: 41 per cent., 33 per cent., 36 per cent., 19 per cent., 7 per cent., for the asylum at Lausanne, and 57 per cent., 53 per cent., 43 per cent., 24 per cent. for the asylum at Munich. Without quoting the numbers, we may mention that scrofulous affections, and blindness by eruptive fevers produced an invariable part of the causes of blindness. Nervous affections, on the contrary, follow an ascending scale, both at Lausanne and at Munich. The corresponding numbers are 3 per cent., 9 per cent., 27 per cent., 21 per cent., for Lausanne, and 3 per cent., 8 per cent., 21 per cent., 30 per cent., for Munich.—SULZER.

MEDICAL JOURNALS.

Clinical and Experimental Study of the So-Called Oyster Shuckers Keratitis, by DR. ROBERT L. RANDOLPH (*Johns Hopkins Hospital Bulletin*, December, 1895).

This form of keratitis prevails where oyster shucking is carried on extensively. It is found more frequently in Maryland than in any other part of America, and the reports of the hospitals in Baltimore during the last few years contain the records of several hundred cases.

Dr. Randolph, as the result of his study of sixty-five cases and of experiments made with the view of learning the nature of the disease, arrives at the following conclusions:

1. Oyster shucker's keratitis may be defined as a traumatic keratitis where the injury is produced by a particle of the oyster shell.
2. The disease is chiefly remarkable for the rapidity with which the cornea undergoes necrosis at the site of the injury, this area of necrosis being usually small, owing no doubt to the small size of the foreign body. Other foreign bodies usually produce no such noticeable keratitis. This form of injury induces a marked infiltration of cornea within twenty-four hours after the accident.
3. This decided reaction on the part of the cornea makes the injury a particularly dangerous one.
4. Bacteriological investigations failed to discover any specific organism nor did any organisms obtained from cases of oyster shucker's keratitis manifest any pathogenric properties in the cornea of rabbits. It is not likely that the disease is of parasitic origin.
5. The carbonate of lime of which the oyster shell is largely composed was found to possess qualities irritating enough to call forth a keratitis when introduced into a rabbit's cornea, and it is more than probable that several other chemical ingredients of the shell would be more or less irritating to the cornea.
6. Bacteria always play a part in traumatic keratitis, but in this variety the cornea is rendered peculiarly susceptible to the effects of micro-organisms by the irritating chemical ingredients of the shell, notably by the carbonate of lime.

Extirpation of the Lachrymal Glands for Epiphora, by DR. HEGG (Berne). (*Corresp. Blatt. f. Schweizer Aerzte*, Nov. 15, 1895.)

After giving a history of the operation. Dr. Hegg declares himself in favor of the excision of the palpebral gland in the cul-de-sac of the everted lid after the method of deWecker for simple epiphora from

constituted by the loss of sight. Their development is found to be fettered by this fact, and this is observed especially among the meningitic.

"What is the channel of that perception by which the blind man perceives the proximity of a house, which is 15 or 20 metres in front of him?" We may reply in the most positive fashion that it is by means of hearing that the blind man acquires a relatively distinct knowledge of what surrounds him. The noise of footsteps on the ground or the flag-stones, the noise of a stick or umbrella striking the earth, or even the noise of clapping hands, undergo modifications according to the objects which, placed about us, interrupt the sound waves and reflect others, which, returning to our ears, augment and modify the sound.

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MEDICAL JOURNALS.

Clinical and Experimental Study of the So-Called Oyster Shuckers Keratitis, by Dr. ROBERT L. RANDOLPH (*Johns Hopkins Hospital Bulletin*, December, 1895).

This form of keratitis prevails where oyster shucking is carried on extensively. It is found more frequently in Maryland than in any other part of America, and the reports of the hospitals in Baltimore during the last few years contain the records of several hundred cases.

Dr. Randolph, as the result of his study of sixty-five cases and of experiments made with the view of learning the nature of the disease, arrives at the following conclusions:

1. Oyster shucker's keratitis may be defined as a traumatic keratitis where the injury is produced by a particle of the oyster shell.
2. The disease is chiefly remarkable for the rapidity with which the cornea undergoes necrosis at the site of the injury, this area of necrosis being usually small, owing no doubt to the small size of the foreign body. Other foreign bodies usually produce no such noticeable keratitis. This form of injury induces a marked infiltration of cornea within twenty-four hours after the accident.
3. This decided reaction on the part of the cornea makes the injury a particularly dangerous one.
4. Bacteriological investigations failed to discover any specific organism nor did any organisms obtained from cases of oyster shucker's keratitis manifest any pathogenric properties in the cornea of rabbits. It is not likely that the disease is of parasitic origin.
5. The carbonate of lime of which the oyster shell is largely composed was found to possess qualities irritating enough to call forth a keratitis when introduced into a rabbit's cornea, and it is more than probable that several other chemical ingredients of the shell would be more or less irritating to the cornea.
6. Bacteria always play a part in traumatic keratitis, but in this variety the cornea is rendered peculiarly susceptible to the effects of micro-organisms by the irritating chemical ingredients of the shell, notably by the carbonate of lime.

Extirpation of the Lachrymal Glands for Epiphora, by Dr. HEGG (Berne). (*Corresp. Blatt. f. Schweizer Aerzte*, Nov. 15, 1895.)

After giving a history of the operation. Dr. Hegg declares himself in favor of the excision of the palpebral gland in the cul-de-sac of the everted lid after the method of deWecker for simple epiphora from

hypersecretion when the secretion is not carried away with sufficient rapidity, and in cases of fibrous displacements. If there is disease of the sac this should receive first attention. He adds another indication, rebellious recurring phlyctenular keratitis, which always seriously threaten the sight, and which was complicated by abundant reflex lachrymation. This lachrymal flow carries away the madication and prevents its action. In unruly patients Dr. Hegg does not find cocaine sufficient, and he resorts to general anætheism in the operation for the removal of the glands.—G. H.

Effects of the Section of the Trigeminal Nerves and its So-called Trophic Influence Upon the Cornea, by DR. WILLIAM ALDREN TURNER (*Brit. Med. Jour.*, Nov. 23, 1895.)

The recent experiments of Gaule (*Centralbl. für. Physiol*, 1891, p. 409), have suggested the conclusion that the section of the ophthalmic branch of the fifth pair and lesions of Gasse is ganglion produce in the rabbit, true trophic lesions of the cornea, such as foci of atrophy or hypertrophy of the superficial epithelial layer of Descemet's membrane, necrosis and atrophy of the proper substance, or secretion of fibrinous substance in the aqueous humor.

The author, in collaboration with Ferrier has sectioned the trunk of the fifth pair, the ophthalmic branch and the medullary root upon the rabbit. The tubercle of Rolands has been destroyed in four animals, and in two the ascending root (corpus restiformis) was cut. The ophthalmic branch was divided eight times, and the trunk of the nerve, between the ganglion of Gasser and the pons Varolii, four times, and the descending root twice.

These eighteen nervous sections produced anæsthesia of the cornea, but in only two instances did any destructive process or panophthalmia follow. Two animals were infected (rise of temperature); in one the autopsy revealed commencing septic meningitis, in the other the appearance of corneal infiltration, which occurred during the first week, had been accompanied by fever. During the next six weeks the animal did well and the cornea remained clear. During the sixth week, panophthalmia occurred after a renewed elevation of temperature. Fifteen animals presented neither opacities nor ulcerations of the cornea. A slight dryness of the cornea resulted from the failure of lubrication by the almost immovable lids, and was the only symptom observed. The survival of the animals varied from forty-eight hours to four months.

After the section of the right ophthalmic branch, both corneas were cauterized by nitrate of silver crayon. The effect produced and the process of repair were identical on the two sides.

The author concludes that the destructive processes observed as result of the section of the fifth pair should not be attributed to paralysis but to excitation of the nerve.

Report of the Commission Appointed to Investigate the Census of Blindness and Deaf-Mutism in Holland, by Dr. DAYER. (*Nederl. tydschr. voor genuk*, 189 , II, p. 1112.)

The census of 1890 shows that there are 2114 blind persons in Holland; 1401 of these were examined by different oculists who found the following census:

Ophthalmia of the new-born	80
Ophthalmia purulent	21
Ophthalmia gonococal	12
Trachoma	36
Keratitis	96
Irido choroiditis	106
Neuritis and neuro-retinitis	56
Pigmentary retinitis	32
Detachment of the retina	43
Atrophy of the optic nerve	174
Glaucoma	117
Senile cataract	109
Small pox	31
Traumatism	63
Sympathetic Ophthalmia	31

There is one blind man to every 1956 men and a blind woman to each 2341 women or an average of one blind to 2247 inhabitants.

In 1870 there was one blind to 2247 inhabitants.—*Westhoff.*

A Peculiar Case of Embolism of the Central Artery of the Retina, by Dr. KESSLER. (*Genuk tydschr. von Nederl. Indie.* T. XXXV, p. 550.)

An officer has during six days observed a contraction of the visual field of the right eye. The visual acuity is $\frac{3}{8}$. The extent of the visual field is about 10° upward and to the nasal and temporal sides but only 5° downward. The pupillary reaction is good for direct light but sluggish when the luminous source has an eccentric position. The papilla is pale and the retina œdematous. The retinal veins are less than normal size; the retinal arteries are filiform except two branches which pass from the papilla toward the macula, and which are of normal calibre. The condition is not changed by massage; the papilla continues to become atrophied and the arteries become smaller. The visual field remains stationary.

It is probable that the macular arteries part from the central artery behind the seat of embolism.—*Westhoff.*

Extraction of Cataract, by Dr. Heuse. (*Zeitschrift zur Feier des 50-jährigen Jubiläums des Vereins der Aerzte des Reg. Bez. Düsseldorf,* Bergmann, ed., Wiesbaden, 1895, p. 302.)

Heuse prefers antisepsis by sublimate to asepsis in extraction of cataract. Antisepsis has given him better results than asepsis and he is enthusiastic for sublimate. "The power of sublimate is most effctual. What magical influence does it not produce when injected under the conjunctiva in a dose of only one milligramme. I have seen cured as by enchantment, by such an injection, within a few weeks, an eye, which was wounded a few years ago by a foreign body and presenting a recent purulent inflammation proceeding from the old traumatism of the iris. For more than a week he had passed sleepless nights, the victim of tormenting pains and this small dose of one milligramme of sublimate brought relief and sleep within a few hours. Six days later the pus was absorbed and all irritation had disappeared."

"I have known subconjunctival injections of sublimate to act in the same remarkable manner in punctate keratitis and in torpid ulcerations of the cornea."—*S.*

Contribution to Blefaroplasty, by Dr. Uhthoff. (*Deutsche Medicin. Wochenschrift,* 1895, p. 473.)

In a case of cancroid in which total excision of the lower eyelid had become necessary, Uhthoff formed a new lid in the following manner: The exterior part is formed by a flap taken from the skin of the forehead and the corresponding side of the nose; the interior part of the flap is doubled by a rectangular flap cut from the skin of the superior lid and turned backward. The seventh day after the operation, the base of this flap was cut along the free border of the upper lid.

ANNALES D'OCULISTIQUE

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I.—ORIGINAL CONTRIBUTIONS.

MEMOIRS

BINOCULAR VISION.

By Dr. **H. PARINAUD.**

Dr. Meyer, in his report to the French Ophthalmological Society (see this number), has endeavored to show us the condition of science in regard to binocular vision. The result of this report will be to show the impossibility of extracting from all that has been written on the subject a general conception of binocular vision, I might almost say the impossibility of obtaining precise ideas.

The study of binocular vision must be reconstructed on new bases. Binocular vision, such as it has been described, is artificial and does not correspond to the reality. This depends upon the fact that it has been investigated by psychologists and mathematicians instead of by physiologists, properly speaking, by biologists. Helmholtz, accepting the tradition which was in existence at the time when he wrote his book, carried on that tradition, and I do not hesitate to say that, through the great and legitimate renown of his name, he has contributed more than any other to maintain us in this error. The reason for facts was sought in natavistic and empirical doctrines, or again in horopters, which however complicated they may be, can only give a false idea of the identity of the retinæ and of binocular vision. It is only a question of psychic influences, of neutralization, attraction or repulsion of images, of need of fusion, of horror of binocular vision, etc., so many expressions void of sense which take us back to the time when the rise of water in pumps was explained by the horror of a vacuum.

But the inconvenient principle of these explanations is not that they explain nothing, it is to maintain the question on sterile ground where no serious progress is possible. It is to turn the mind from the true aim of physiological optics which is *the explanation of visual phenomena by properties of the structure of the visual apparatus.* It is indispensable and urgent to do away with all these conceptions and to bring the question to its proper territory which is physiology.

If objection is made that to explain the visual phenomena by the structure of the visual apparatus, it would be necessary to know this structure, I would reply : It is possible that the question may be difficult, but it is not by turning one's back to the truth that the truth will be found. If it is true that a question well put is half solved, it is important to put the question properly.

Nevertheless, the difficulty is not as great as it would at first seem if one is careful to disengage his mind of the conceptions with which this question has been complicated and obscured.

It is certain that we are not in a condition to deduct the function of the visual apparatus from our anatomical knowledge, and we will not be for a long time. Undoubtedly we should above all take into consideration anatomical discoveries. But it is precisely the more recent discoveries, discoveries from which come the theory of neurons, which put us on our guard against the schemes which are brought out from time to time. These schemes are infantile in regard to the complexity of the nerve connections which are supposed to explain the function of binocular vision. They are perhaps more dangerous than the psychological hypotheses of mathematical deductions because, while being quite as false, there is a greater tendency to take them for the reality.

To what sources should we then resort to penetrate the mechanism of binocular vision? There are two: physiological experiments and clinical observation, the indications of which accord admirably.

It is necessary to define and limit the apparatus of binocular vision.

The first truth which must be considered and which Dr. Meyer ignores from the beginning of his report, is that binocular vision should not be confounded with vision of the two eyes. The apparatus of binocular vision is not the entire visual apparatus. There are two kinds of vision with the two eyes which may be called *simultaneous vision* and *binocular vision* properly speaking.

Every apparatus in the animal organism is in general composed of three parts: a sensory portion, a motor portion and the connections which unite the sensory and the motor portions. What physiology demonstrates is confirmed by the minute anatomy of the brain. The brain, according to the statement of Ramon y Cajal, is formed of series of sensory and motor centres joined together. The connections between the sensory and motor centres constitute the anatomical basis of reflex actions.

The sensitive or sensory portion of the apparatus of binocular vision is represented by the connections of the retinæ with the visual centres, destined to assure their synergic action, connections which are shown by the existence of points called identical or corresponding. The result of these connections is:

1st. The faculty of exteriorating or projecting at the same time the images of each eye, producing diplopia.

2d. The projection of these images in a determined direction depending on the relative position of each eye.

The motor portion of the apparatus of binocular vision is represented by convergence. Convergence destined to assure the formation of images of the object fixed on the two fovea and, in a general manner, the formation of the same points of an object on corresponding points of the two retinæ, is indispensable to assure synergic action of the retinæ. Without it the identity of the retinæ, such as it exists in man, would have no reason for existence.

The connections uniting the sensory and the motor portion of the apparatus of binocular vision are represented by a special reflex in idea of the identity of the retinæ and of binocular vision. It is only a question of psychic influences, of neutralization, attraction or repulsion of images, of need of fusion, of horror of binocular vision, etc., so many expressions void of sense which take us back to the time when the rise of water in pumps was explained by the horror of a vacuum.

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Nevertheless both visual fields continue to be impressed by surrounding objects, including the object fixed. What is the reason for this substitution of one mode of vision for another? Because binocular vision cannot be exercised normally under such conditions. If, in aiming with both eyes, we fix the sight, the object will be seen double, and if we fix the object, the sight will be seen double. It is not necessary, in explaining facts of this nature, to call in a psychicical neutralization. It is the mode of excitation of the retina which causes this substitution without our being conscious of it.

Whenever binocular vision is solicited under conditions where it cannot be regularly exercised, simultaneous or alternate vision tends to be substituted for binocular vision. Stereoscopic vision gives further proof of these facts.

If we place in the two fields of a stereoscope two images capable of giving by their fusion the impression of a single object, binocular vision naturally comes into play. If, on the other hand, we endeavor to fuse two dissimilar images, phenomena of the visual fields are produced, by reason of which Helmholtz did not hesitate to say that visual phenomena could not be explained by anatomical arrangement but were the result of psychic action. The antagonism of the visual fields is none other than the antagonism of the different methods of vision which is produced when one calls upon binocular vision under abnormal circumstances.

The apparatus of binocular vision being thus limited, vision of strabismics is naturally explained and strabismus, considered as a deviation and as a visual disturbance, justifies in itself alone the distinction which I have just drawn.

I have defined strabismus as *a vice of development of the apparatus of binocular vision* affecting both the sensory and the motor portion of this apparatus. This vice of development, on the contrary, respects the apparatus of simultaneous vision both in its sensory and motor portions.

All the causes of strabismus, whether it be an error of refraction, a leucoma of the cornea, or a cerebral affection, act as obstacles to binocular vision and prevent the development of the apparatus of binocular vision. These causes will be the more efficacious as they act on the younger subject whose apparatus of binocular vision is still not fully developed.

The deviation once established, binocular vision is at once suppressed and from the outset replaced by simultaneous vision. The deviating eye is not, therefore, excluded from vision, but it continues to perceive objects at the same time as the other eye. Furthermore, it exteriorates its impressions normally whatever be its position. It is easy to be assured of this by exploring the visual field of this eye, isolated by means of a screen, during fixation with the non-deviating eye. In the motor portion the same difference exists and it is convergence alone which is involved, the associated movements of direction remaining intact.

But it is particularly in following the development of strabismus that one sees the distinction become marked as the vice of development affirms itself. What do we see occur when the strabismic deviation has existed for a certain time? Three facts:

1st. After correction of the strabismus the difficulty and sometimes impossibility of obtaining diplopia, that is the alteration of the faculty of exteriorating the images of each eye at the same time, an essential function of binocular vision.

2d. When diplopia exists the slight tendency or complete abolition of the tendency to fusion, that is to say an alteration of the retinal reflex of convergence.

3d. Progressive alteration of the innervation of convergence which may go as far as complete abolition in convergent strabismus as well as in divergent strabismus.

Thus in strabismus the apparatus of binocular vision is altered in all three portions while the apparatus of simultaneous vision remains intact or is only modified in an indirect manner by the secondary alterations caused by the deviation. In fact, strabismic eyes continue to see objects simultaneously; retinal stimulations continue to cause associated movements of direction by reflex action; the innervation of these associated movements of direction continues to take place in a regular manner.

In strabismus the apparatus of binocular vision tends, then, to alteration and disappearance. Sometimes it is developed in an abnormal manner. Diplopia certainly exists but the retinal connections with the visual centres are irregularly developed and projection, the consequence of these connections, is also irregular. This fact is not at all surprising for the physiologist. It leads us to point out the significance of binocular vision and strabismus from the point of view of the evolutionist.

Organic apparatus, considered especially in their relation to cerebral development, are perfected by successive differentiations of anatomical elements of the species as well as in the individual. These modifications are determined by the exercise of the function and naturally adapt themselves to the needs of the function.

The cellular development of the brain is less fully developed at the time of birth in man than in animals. This apparent inferiority in man makes, in reality, his superiority, for if he is less perfectly endowed than the animal at the time of birth, he is more perfectible, that is to say his brain is more susceptible of being developed by exercise. But the more an apparatus is susceptible of being developed by the regular exercise of its function, the more also is it susceptible or arrest of vice of development when the function is impeded or is exercised irregularly from infancy.

Binocular vision, from the point of view of the evolutionist, appears to us as a function brought to perfection which is not essential as certain individuals are deprived of it without suspecting it. It appears as the result of an anatomical differentiation developed on an apparatus more fundamental and more firmly organized hereditarily which is that of simultaneous vision. Thus it is explained how the apparatus of binocular vision may be altered independently of the apparatus of simultaneous vision. It can be understood how every obstacle to binocular vision can become a cause of strabismus the more efficacious the younger the subject is.

By this brief exposition it will be seen that conclusions drawn from physiology and from clinical experience are perfectly in accord and offer a firm basis for the study of binocular vision.

OCULAR DISTURBANCES OBSERVED IN CASE OF EPITHELIOMA OF THE SPHENOIDAL SINUS.

By Dr. **V. MORAX.**

Much attention has been given of late years to affections of the sinuses of the face and more particularly the sphenoidal sinus, lesions of which formerly escaped clinical observation and most frequently were only found on autopsy.

An effort has been made to determine the symptomatology, but in addition to clear and precise facts, relatively few in number, which cannot be disputed, hasty generalizations have been formed and theoretical considerations into a discussion of which I do not desire to enter.

Ocular disturbances caused by lesions of the sphenoidal sinus have frequently attracted attention, and by their importance render the pathology of the sphenoidal sinus as interesting for the oculist as for the rhinologist.

Three years ago I had occasion to observe a patient whose history was instructive, and in whom the autopsy revealed an epithelioma which had started in the sphenoidal sinus and which for several months had given rise to symptoms absolutely limited to the visual apparatus. As the case was almost complete it has seemed proper for me to publish it, still more so as cases of neoplasms starting in the sphenoidal sinus are extremely rare.

Case I.—*Progressive diminution of vision, then sudden blindness without lesion of the fundus of the eye. Continuous headaches. Later slight optic neuritis, then atrophy of the disc. In the beginning no naso-pharyngeal disturbance, later purulent discharge from the nose and appearance of pediculated tumors on the pituitary membrane. Paralysis of the oculo-motor nerves. Ptosis, exophthalmus from intraorbital tumors. Death one year after the commencement of the affection from bronchopneumonia. Autopsy. Primary epithelioma of the sphenoidal sinus with dilatation of the sinus. Invasion by the neoplasm of the body of the sphenoid, of the optic nerves and of the chiasm. Neoplasmic prolongations into the orbit, the maxillary sinuses and the ethmoidal grooves. Invasion of the orbital surface and the frontal convolutions. Bronchopneumonia.*

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M. Val. . . . 53 years old, came to Dr. Parinaud's clinic, May 12, 1893, complaining of complete blindness of several days' duration, which had been preceded by progressive diminution of vision in both eyes. The commencement of the ocular disturbances dated back to the beginning of the year 1893.

Examination of the patient showed that ocular movements were normal. The pupils were unequal and reacted neither to light nor to convergence. The fundus of the eye showed no lesion. The vessels were normal and the disc was not discolored. Visual perception was completely abolished in both eyes.

The diagnosis then presented certain difficulties and we hoped to find in the study of his antecedents means of establishing the nature of the affection.

The following is what was noted in this regard :

The patient's parents had died in old age without having presented symptoms of tuberculosis or neoplastic affection. He had married at twenty-five years and had had seven children. The eldest daughter had died at the age of twenty-three of pulmonary tuberculosis. Three children had died in the first or second year, of meningitis. The last three children, three daughters, of whom the eldest was sixteen years old and the youngest nine, were in perfect health and had no signs of tuberculosis or hereditary syphilis. His wife, always in good health, had no specific history.

As for the personal history of the patient, there was nothing of note until these latter years. He claimed that he had never had a hard chancre or venereal affection. However, six years before he noticed that his hair had fallen out in large quantities, but was replaced a short time afterwards. At that time he had no headache, angina, laryngitis, and no cutaneous or mucous eruption.

In 1892 he had had some indolent ulcers on the lower limbs, situated principally on the anterior and internal surface of the tibia. These lesions had developed very slowly, and were treated by Drs. Fournier and Hallopeau, at the St. Louis Hospital, with applications of mercurial plaster and ingestion of iodide of potassium. Under this treatment the lesions were completely cured, leaving pigmented cicatrices, slightly depressed and sharply outlined. They were typical cicatrices of cutaneous gummas. The patient had had no other ulcerative lesions since that time.

In January, 1893, continuous headaches appeared, seated especially in the frontal region, and not showing any manifest nocturnal exaggeration. No malaise, no vomiting, and no disturbance of the general condition.

From that time vision, previously perfect, began to diminish slowly and progressively. This diminution of vision continued until May 6, 1893. On that day vision decreased so rapidly that in three days blindness was so complete that the patient could no longer go about alone. The headache had persisted and was still more severe. The patient complained of no trouble in the pituitary membrane or in the posterior cavity of the nasal fossæ. Nasal respiration was perfectly free. The urine contained neither sugar nor albumen.

It was also noted that since the complete loss of vision, the patient had had visual hallucinations. "I see," he said, "flashing objects like shadows, which move but have no distinct form."

From this information, and in the absence of all ophthalmoscopic lesion, these phenomena could only be referred to a lesion affecting the optic tracts or the chiasma.

By reason of the specific history, I thought that the lesions were syphilitic, and for three weeks mixed treatment (inunctions of mercurial ointment, and 5 grammes of iodide of potassium daily), was rigorously carried out.

This treatment, it must be said, caused no improvement.

May 20, 1893.—The headache and amaurosis persisted in the same degree. With the ophthalmoscope a slight amount of optic neuritis was found in the right eye only. The outlines of the papilla was somewhat diffused, and the retinal vessels slightly dilated. The fundus of the left eye was normal.

May 26.—The ophthalmoscopic lesions were the same. A slight anount of ptosis had developed in the left eye since the last examination. As the patient could not be cared for at home, he was admitted to the Bichat Hospital, into the service of Dr. Gaillard Lacombe.

From that the headache was continuous, and with the exception of morphine, no treatment relieved it. Some time after his entrance to the hospital, the ptosis of the left eye became complete. Ocular movements were very limited, and there was marked exophthalmus.

Towards the end of July the exophthalmus had increased. A fairly marked puffiness could be felt at the base of the nose on the right side over the internal orbital wall. At this point the skin was more resistant and of an erythematous tint. Nasal respiration was difficult, and there was a muco-purulent discharge.

In September the patient was examined by Dr. Lermoyez, who replaced the former attendant. He made the following note:

"On the left side, pressure on the os unguis as well as on the orbital wall of the frontal sinus is not painful; on the contrary, on the right side pressure on the os unguis, corresponding to the puffed region, produced pain radiating to the malar bone.

"The left nostril is normal. It is only noticed that the upper portion of the septum seems to be softened and raised by a soft swelling coming from the other side.

"In the right side there is a swelling of the lower turbinated and with some difficulty it can be seen that the nasal fossa is invaded by a gray granular mass, bleeding very readily and giving rise to a free pulsating hemorrhage.

"Posterior rhinoscopy is impossible. Touch reveals the presence of a mass of soft consistency, granular, bleeding freely, especially in the right fossa and continuous with pharyngeal vault especially in its anterior portion."

Dr. Lermoyez thought that this was a tumor the primary seat of which had been the sphenoidal sinus.

September 13th, we noted complete ptosis of the right eye. The pupils were unequal and their reaction abolished. On ophthalmoscopic examination the right disc presented an atrophic discoloration. In the left eye the borders of the disc were less distinct than in the normal condition, there was also a white atrophic color and in addition small retinal hemorrhages around the disc.

The general condition of the patient became very bad and emaciation made rapid progress.

In the middle of December he had bronchitis with febrile symptoms and later bronchopneumonia from which he died.

Autopsy was made December 17, 1893.

Cadaver much emaciated. On the posterior and external surface of the right leg and the internal surface of the left tibia there were typical cicatrices of cutaneous gummas. There were no cicatrices at other points of the integument. The nails were increased in size and deformed.

The cranium was of normal thickness. The dura mater was normal. There was no hyprocephalus. There was no lesion on the convex surface of the hemispheres.

On the other hand when the frontal lobes were raised to remove the encephalon there was found, especially on the right side, a complete adhesion of the orbital surface of the frontal lobe to the base of the skull.

It was necessary to tear the tissues in order to remove the encephalon. This presented no other lesions. The medulla, the pons and the cerebellum were normal.

The alterations were limited to the anterior portion of the base of the skull. The frontal lobes were invaded to a thickness of 1 to 2 centimetres by a tissue of grayish white color, somewhat more resistant than nerve tissue. The limits of this neoplastic tissue were not sharply defined and it was to this tissue that the frontal convolutions owed their adhesions.

After removal of the nerve tissue it was seen that the orbital projections of the frontal bone and the superior surface of the ethmoid were raised and formed a convex surface looking upward. All this surface presented no bony resistance and the point of a knife penetrated for a thickness of several centimetres before encountering bony tissue. The neoplasm extended to the anterior portion of the body of the sphenoid. Laterally it did not extend beyond the internal third of the orbital surface of the frontal on the left side. On the right side the orbital surface was almost completely invaded and the neoplasm could be traced into the orbit to the skin. After separating the orbital vault, the lateral portions of the sphenoid and the basilar apophysis, the tumor was extirpated in its entirety. It was then found that, in addition to the prolongation which the tumor sent into the right orbital cavity, there was another which penetrated the maxillary sinus of the same side. This sinus was filled partly by the tumor and partly by a yellowish gray viscous gelatinous fluid. The ethmoidal cells were invaded by the neoplasm and in the middle meatus it formed irregular polypoid projections which were easily removed. The left maxillary sinus was invaded but less completely than the right. The left orbit was not involved. Behind, the sphenoidal sinus was difficult to recognize as it was covered by the neoplasm which had destroyed its wall and raised up and then surrounded the organs in contact with the body of the sphenoid. The chiasma was pushed upward and backward resulting in a veritable stretching of the optic nerves. On dissection their course could be traced through the middle of the tumor tissue. These nerves were surrounded for an extent of about 1 centimetre from the chiasm. The orbital portion of the optic nerve was elongated and thinned. On section the nerve tissue presented the gelatinous appearance characteristic of atrophy of its fibres. On both right and left sides the orbital nerves were not affected by the tumor with the exception of the elevator of the left upper lid which traversed the tumor in its posterior portion.

The tissue of the tumor was slightly resistant and on scraping gave out a large amount of fluid. In certain points, especially in the right orbital prolongation, there were foci of softening whence on incision a grayish purulent fluid escaped.

Right lung, slight hypostatic congestion; 520 grammes.

Left lung (750 grammes), pleural adhesions of the lower lobe. This lobe was of a brown color with marbling. There was no crepitus. On pressure a drop of pus escaped from the bronchi. The lung tissue did not float.

There was, then, bronchopneumonia which had caused death.

Liver (1,420 grammes), no cicatrices. Slight suprahepatic congestion.

Spleen (90 grammes), small, hard and no cicatrices.

Kidneys (170 grammes), showed no microscopical lesions.

Heart, myocardium and valvular orifices normal.

In none of the organs was there a secondary nucleus of the cranial tumor.

Histological examination.—Fragments of the tumor taken from the nasal fossæ and the summit of the orbit, and also the optic nerve and the posterior pole of the right eyeball were fixed in acid sublimate, hardened in alcohol and imbedded in paraffine or celloidine.

The following are the details of a section from a fragment of the tumor near the body of the sphenoid surrounding the chiasma :

What attracted attention at first view was the peculiar arrangement of the tissue which gave the impression of glandular tissue. There were in fact alveoli of various sizes tiled with regular cylindrical epithelium. This epithelium was formed of a single layer of cells the large nucleus of which was situated near the surface of implantation. The centre of the aveolus was free or filled with granular masses in which could still be recognized desquamated epithelial cells, leucocytes and, in some parts, blood corpuscles.

In some of the alveoli this central granular mass did not take the stain and appeared to be entirely composed of dead epithelial cells.

In addition to these alveoli there was also simple tubes filled with epithelial cells and without central lumen. Finally on the borders of the large alveoli there were small epithelial buds penetrating into the stroma and derived from the cylindrical pavement epithelium.

The stroma of the tumor was composed of connective tissue the fibres of which were more or less dense according to the points examined. There were a small number of connective tissue cells. On the other hand there were at certain points islands of infiltration of leucocytes. The vessels were relatively small in number. They were, for the most part, dilated capillaries.

On the surface of section of these vessels there was a large number of leucocytes. Some of the larger vessels presented an infiltration of epithelial cells in their external membrane.

In the orbital and maxillary prolongations of the tumor the alveolar arrangement was less pronounced. Here the simple tubes of epithelial cells were more abundant.

The lesions of the optic nerve were also very interesting. In the chiasm, as well as in the entire extent of the intraneoplastic course of the optic nerve there was an intimate adhesion of the nerve tissue with the tumor infiltration. The perineurium was difficult to recognize as it was invaded by the tumor. The latter sent irregular prolongations into the nerve tissue. The prolongations extended in to a quarter of the diameter of the optic nerve. At no point did they reach the central portion.

In the parts of the optic nerve not invaded by epithelial infiltration there was a marked sclerosis and complete atrophy of the nerve fibres.

Transverse sections of the optic nerve, 5 millimetres from its bulbar extremity, showed the same atrophic lesions. The epithelial infiltration of the optic nerve did not extend beyond the intraneoplastic portion of the nerve.

In the papilla there was also a marked perivascular sclerosis and atrophy of the nerve fibres.

I have said that in the tissue of the tumor, and especially in the orbital prolongation on the right side, there were purulent foci, veritable cavities filled with gray nonfetid pus. Bacteriological examination of this pus showed streptococci, both on microscopical examination and by culture. There were consequently infectious foci enveloped in the depth of the tumor the mode of entrance of which was evidently by the nasal mucous membrane.

In conclusion the symptoms presented by this patient may be divided into two periods :

A first period of four and a half months' duration, during which the only signs were *progressive diminution of vision* which terminated by sudden loss of luminous perception. This visual diminution was accompanied only by continuous and *severe headache*. During this period, or at least from the 12th to the 20th of May, the visual disturbance was explained by *no modification in the fundus of the eye*.

The second period commenced fifteen days after complete loss of vision and was characterized by the appearance of *opthalmoscopic lesions*. First, on the right side only, there was slight *optic neutritis* shown by slight vascular statsis and a diffuse appearance of the outlines of the disc. To this neutritis succeeded papillary *atrophy*, while the left eye in its turn presented signs of neutritis and consecutive atrophy. To this second period correspond the appearance of indisputable signs of orbito-nasal neoplasm ; ptosis on the left side, followed by exophthalmus and ophthalmoplegia, disturbance of nasal respiration with purulent discharge from the nostrils, pediculated tumors of the pituitary membrane and infiltration of the orbital tissue and of the base of the nose.

These different symptoms appeared progressively without remission and at the same time a marked cachexia developed.

The second period terminated after a duration of four and a half months by death from bronchopnuemonia.

Autopsy showed the existence of a neoplasm, which, developing in the cavity of the sphenoidal sinus, had compressed and then invaded its walls, had been propagated in all directions, infiltrating above and posteriorly the body of the sphenoid and the chiasma, sending prolongations into the maxillary sinuses, into the orbits, forward to the pituitary membrane, upward through the ethmoid, attacking and infiltrating the frontal convolutions, without giving rise to isolated secondary nodules separated from the primary mass.

The development of the neoplasm had exercised a double action on the optic nerves: a direct action in destroying the nerve tissue of the chiasma and posterior portion of the optic nerves; and indirect action resulting on the one hand from elevation of the chiasma from enlargement of the sphenoidal sinus, and on the other hand from invasion of the orbital tissue by prolongations of the neoplasm pressing the eyeballs forward; there was as a result a continuous and veritable stretching of the optic nerves.

Can the symptoms observed be explained by the lesions found on autopsy? It is evidently easy to account for the blindness, but as for the evolution of the process producing diminution of vision without ophthalmoscopic lesions, then the sudden blindness and later the visible alterations in the papilla, only approximate and hypothetical ideas can be formed. It is, in fact, impossible to decide whether it was primarily mechanical compression of the optic nerves by dilatation of the sphenoidal sinus, or progressive invasion of the nerve tissue by the neoplasm which provoked the functional disturbance of vision. If the patient had been examined before he became blind when there was only a diminution of vision, perhaps some information might have been given by the examination of the visual field which would have given a basis for an interpretation. As such an examination was not made I prefer not to enter upon a useless discussion.

I have consulted literature for observations similar to that which I have just described and find the following:

In an article on the *Symptoms of Diseases of the Sphenoidal sinus*[1] Dr. Berger mentions a case of carcimonia described by Albert.[2]

On referring to the original I find: "Affections of the sphenoidal sinus are not commonly manifested by recognizable signs. I once saw the sphenoidal sinus completely filled with a decomposing carcinomatous mass without the slightest symptom having been observed during life." This case is unavailable as details are lacking and it is highly probable that this "decomposing carcinomatous mass" was none other than a pure and simple empyema of the sphenoidal sinus.

In the case published by Durante[3] invasion of the sphenoidal sinus was evidently secondary and, although his clinical information was insufficient, may be supposed that the original of the epithelioma was in the mucous membrane of the turbinated bones or in the ethmoidal cells. This was also a case of infected epithelioma with foci of suppuration. No ophthalmoscopic examination was made and the patient complained of disturbance of vision.

We see, therefore, that documents are completely lacking and we must be content to record cases until a sufficient number are brought together to enable us to sketch the principal clinical symptoms which will lead to a recognition of neoplasms originating in the sphenoidal sinus.

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[1] *Bulletin et memoires de la Sociètie Francaise d'otologie et de laryngologie*, 1888.

[2] Albert. *Lehrbuch der Chirurgie*, 1887, p. 332.

[3] Durante. Tumeur mixte (epithelic-sarcome) des fosses nasales. Envanissement des lobes frontaux, abces latent du cerveau. Mort subite, June, 1890.)

OPHTHALMOLOGICAL NOTES.

By Dr. **A. TROUSSEAU.**

Removal of Pterygium.—Study of Iridectomy in Chronic Glaucoma.—Treatment of Granular Conjunctivitis.—Survival after the Appearance of Albuminuric Retinitis.

Removal of Pterygium.—Three years ago I gave up touching the body of the pterygium and have since removed the head and opposed future progression by cauterizing the union of the head and the body a little behind the sclero-corneal limbus. The cauterization should be deep enough to reach the sclera. Its form is that of an arc with external concavity conforming to the curvature of the limbus. I thus propose to prevent the progress of the pterygium by a veritable cicitricial barrier and as yet have seen no recurrence. I may add that of the twelve patients operated upon by this method I have only been able to follow three and hence cannot conscientiously affirm that this method is a guarantee against recovery, but it seems to me that the chances are not as bad as with the other operative methods.

For these last three years I have also given up cauterizing the point of adhesion of the pterygium to the cornea and instead detach it with a fine knife. Since the communication of Dr. Deschamps I have substituted the curette for the knife and have found, as have Drs. de Wecker and Jocqs, that this curreting is followed by good transparency of the cornea.

There are then two steps to the operation: 1st, separation of the head and the body by deep galvano-cauterization; 2d, curetting of the portion of the cornea on which the head of the pterygium is implanted.

Study of Iridectomy in Chronic Glaucoma.—From numerous conversations which I have had with several ophthalmologists I believe that most of them have given up iridectomy in the treatment of chronic glaucoma. Cases which I have observed with the greatest care for six years have convinced me not only of the uselessness, but also of the inconveniences of this operation applied to the cure of simple chronic glaucoma when there are no symptoms of manifest ocular tension.

I have, for six years, followed a few patients of whom I have noted the cases in detail, observing the slighest changes occurring in the visual field, in the visual acuity and in the ophthalmoscopic symptoms. My investigations were made on cases as similar to each other as possible, glaucoma of slow progress not accompanied with marked elevation of intra-ocular tension.

The following is a summary of my observations of ten cases:

Influence of Iridectomy.—In ten cases the operation almost immediately caused a diminution of vision. This diminution of vision varied in quite large proportions: in one case from $\frac{1}{8}$ to $\frac{1}{10}$ and in another from $\frac{1}{4}$ to $\frac{1}{10}$. Once iridectomy was followed by a cataract, probably traumatic, which proves that it is not always an operation without danger, a fact which is well known. In another case the operation caused a copious hemorrhage which had a fatal influence on the eyeball. In this case there were no retinal hemorrhages. These two operations were, nevertheless, performed by skilled ophthalmologists and I had examined the patients one month or three weeks before the operation.

The visual field increased 5° to 6° in one case, it did not seem to be dininished by the operation in eight cases and in one only there was a loss of 15° four weeks after the operation.

In the ten patients the practical loss of vision occurred between two and three and a half years after the iridectomy.

In brief, none of the patients were benefitted by the the operation, almost all deplored it and two by reason of it completely lost their sight.

Influence of Medical Treatment.—I have followed eight cases treated exclusively by medical treatment without surgical intervention. The treatment consisted of instillations of pilocarpine and eserine, and internal administration of iodide, bromide of potassium and salts of quinine. I have never seen a sudden aggravation and the stationary condition (that found when treatment was commenced) seems to have maintained longer than in iridectomized subjects. The first symptoms of aggravation appeared from three months to one year after the first medical treatment. Practical loss of vision did not occur until from two to four and a half years after the day when the treatment was begun.

In short the condition of none of the patients was aggravated by this treatment and they only enjoyed its extraordinary curative virtues.

Comparison of an eye operated upon and one not operated upon in the same patient.—This comparison is very instructive and although I have only been able to make it on five patients it contributes to strengthen the opinion stated at the beginning of this article. I have followed these patients with great care and if for three of them a definite solution can not yet be given, I can fortunately record the termination of two of the cases. In two of these patients blindness occurred four years after their first visit to a specialist which was made comparatively late. When I saw them they had neither undergone operation and both eyes were about equally affected. The right eye was iridectomized and they were so little satisfied with the operation they objected to having the operation performed on the other eye. The first patient practically lost the sight of the eye operated upon one year and a half before the other and in the second patient vision disappeared almost at the same time in both eyes.

The condition of the patients at the time of operation was as follows:

A. OD. $V = \frac{1}{7}$ nasal visual field $= 40°$
OS. $V = \frac{1}{5}$ nasal visual field $= 43°$
Moderate excavation.
B. OD. $V = 1/3$ nasal visual field $= 45°$
OS. $V = 2/3$ nasal visual field $= 50°$
Slight excavation.

It was the latter patient who lost the sight of both eyes at about the same time.

After iridectomy the vision of the first patient diminished from $\frac{1}{7}$ to inability to read the first line of Parinaud's scale beyond 3 metres. That of the second patient diminished from 1/3 to 1/4. The visual fields did not begin to diminish till three months after the operation but the relative losses in the conditions of each eye were as rapid in the right as in the left.

If a conclusion could be drawn from these two cases it might be said that the first proves that iridectomy aggravated the situation while the second shows that it may be of slight ultimate benefit since the worst eye which was iridectomized had lived as long as its mate which was better and not operated upon. If one considers the slight difference between the two eyes it will be seen that it requires much good will to accord any advantage to iridectomy in this case.

The other three cases are not complete as the patients still retain their sight. At the present time two seem rather to have lost by the operation since they cannot read with the iridectomized eye which, it is true, was the most affected at the time of operation, while they employ the non-operated eye with advantage.

At the time of operation the following was the condition of the patient.

A. OD. (operated upon) $V = \frac{1}{10}$ nasal visual field 30° to 35°
OS. $V = \frac{1}{5}$ nasal visual field 45°
B. OD. $V = \frac{1}{4}$ nasal visual field 55°
OS. (operated upon) $V = \frac{1}{5}$ nasal visual field 55°
Marked excavations in both cases.

If the condition of the two eyes of the patient B are compared it will be seen that at the time of the operation they were almost the same and the operation seems later to have precipitated the progress of the glaucoma. In both cases the iridectomy has, as is common, diminished the visual acuity.

The description of the last case is as follows:

Nine years ago I saw a man sixty years old who about three or four months before has been affected with simple chronic glaucoma in the right eye. Iridectomy was performed by some foreign physician on the diseased eye and two years afterwards the vision of this eye was abolished. At that time the left eye, which I had examined from time to time, and which until then had appeared healthy, with the exception of a slight contraction of the visual field, began to show symptoms of glaucoma and this eye, which was not operated upon, still enjoys vision. The iridectomized eye, then, lived two or three years while the eye not operated upon the preserved vision for seven years since the commencement of the disease.

I cannot deny that many objections may be made, even in the presence of long observed cases: that the number of cases is too few, the diversity of the cases and even of the eyes in each subject, etc., but it has seemed to me to be of interest to state simply what I have seen and this has been sufficient to persuade me personally that if iridectomy is not always harmful in chronic glaucoma without tension, it is frequently so and is always inefficient. Its inutility by itself should be sufficient to cause its rejection and I cannot understand why it is still so frequently performed (if I may judge from the number of cases so operated upon that I see) in spite of the unfavorable statements made in literature.

Treatment of Granular Conjunctivitis.—I must also speak of the methods of treatment of this hopeless affection, for, alas ! the many promises made for its radical cure have not been kept.

During the term (October to January '96) that I spent in the contagious pavillion of the Quinze-Vingt's clinic I devoted especial attention to a comparative study of several therapeutic methods and regret to say that I have not yet been able to record conclusive results.

Cauterization with chromic acid, applications of creosote and steresol ointments gave no satisfaction. None of the antiseptic fluids (I think they were all employed) improved the situation.

At the commencement of my trials I was struck with the favorable modification in the mucous membrane caused by rapid and short applications of formaline repeated only every four or five days. The granulations quickly disappeared, and I thought that I had in hand a superior method until I found that formaline acted on the cornea caused temporary disturbance in its transparency. I then discontinued its use.

Chloride of zinc in saturated solution is very well supported by the transparent membrane and attacks the granular tissue quite vigorously, but its action is rapidly exhausted, and all things considered, it has no real advantage over the other caustics.

I thought that by causing the fluid to penetrate into the midst of the granular tissue, I might obtain a better result, so I tried employing a needle previously dipped in chloride of zinc and with it pricked into the infiltrated tissue from place to place. I thought that thus I could destroy the granulation and create about it a tissue which would resist further invasion. I have not been able to record a definite success.

Crude petroleum has once again shown the temporary effects in the reactionary forms which do not well support other substances.

The best results were obtained with tincture of iodine. After various trials I decided upon the iodized glycerine in the proportion of half glycerine and half tincture. The solution should be applied every day or every other day according to the irritation of the entire extent of the diseased mucous membrane which, under the influence of this medication, soon assumes a smooth appearance as though varnished. Pannus disappears very rapidly, and I consider the iodised glycerine as one of the best means of modification that we possess. However, its value seems to be about equal to that of copper dissolved in glycerine in the proportion of 0.76 grammes to 10 grammes, which is also an excellent form of medication. Some patients support the iodide better than the copper and reciprocally.

In short, with the exception of surgical treatment which is rarely indicated and rarely curative in the perfect sense of the word, the best results have been obtained with iodide or copper.

Survival after the appearance of albuminuric retinitis.—That the appearance of retinitis in albuminuric subjects is a sign of bad augury and that the ocular lesions denote in these patients a faulty condition of the blood and of the circulatory apparatus, are facts first presented and finally established by works of sufficient authority.

It seemed to me of interest to investigate the exact duration of survival dating from the day of appearance or rather of discovery of retinal lesions. I have been preceded in this quest by several authors whose conclusions it may be useful to compare with those which I have found. I will only mention those which are the most reliable. Rieley (Ophth. Society, January 26, 1896) states that when retinal symptoms appear, the survival is not on an average more than eighteen months. Snell (Ophth. Society, 1888) formulated the following statistics: of 103 patients with nephritic retinitis, 57 died in the first year and 12 in the second year.

Baronne Possauer (Zurich Thesis, 1894) only utilized typical cases with well demonstrated albuminuria. She found that 59 per cent. of the patients of her private clientele died two years after the diagnosis, that all the men of her hospital clientele died in less than two years, while three women (of 33 patients) survived more than two years.

There is then a great difference in the prognosis according as the social position of the patients enables them to have more rigid care and hygiene, at least if it is granted that patients of the poor class do not seek medical advice until a longer time after the commencement of the disease, which would equalize the chances.

For my part I have not been able to find a sufficient difference between the patients in Quinze-Vingt's clinic and those of my private clientele to make it interesting to divide them into two classes. Neither have I found that the prognosis was different in men and in women, so I prefer to present the clinical facts which I have collected all together, reserving mention of the detail if I am led to it by future study.

I have complete notes of 45 patients, all presenting characteristic symptoms of albumenuric retinitis, and all having a notable quantity of albumen in the urine. Of these 45 patients, 3 are living after 4 years, 4 after 3 years, and 10 after 2 years; 28 patients, more than half of those examined, died in less than 2 years; 8 of them succumbed the first year, 3 dying in less than 6 months. One woman, treated for hysterical symptoms until the day when she complained of visual disturbance, when I discovered typical double albumenuric retinitis of great intensity, died exactly one month after the appearance of the retinal disease. Her urine contained a large proportion of albumen.

This short note, which leaves many points for elucidation, does not pretend to be a discussion of this subject. Its only aim is to again point out the particular gravity of that important element in diagnosis, albumenuric retinitis.

NEW METHOD OF KERATOTOMY FOR IRIDECTOMY OR CATARACT EXTRACTION IN CASE OF COMPLETE OBLITERATION OF THE ANTERIOR CHAMBER.

By Dr. **A. DARIER.**

There is no longer need for discussion with regard to the importance of iridectomy in case of complete occlusion of the pupil, but the operation is frequently quite difficult to accomplish when the accumulation of fluid behind the iris has produced a marked protrusion of the membrane, and even complete obliteration of the anterior chamber.

Many operative processes have been proposed, but the most simple and the most frequently employed is that which was practised by von Graefe, who traversed both the cornea and the iris.

This process presents many inconveniences. First, it often induces hemorrhages which interfere greatly with the succeeding operative steps, and besides it is often difficult to obtain a firm hold of the iris and draw it outside. Then, in seizing the iris thus, from behind the lens, may easily be injured, and thus render an optical pupil of little profit.

It is especially important, in adherent leucoma with attachment of the iris to the cornea, to see distinctly the amount of iris which should be excised, and also, and above all, to avoid any injury of the lens.

There are other cases in which still more serious operations are required. Under certain circumstances it may seem proper, in the presence of pupillary occlusion, to perform extraction of the lens at the same time as iridectomy. This is a difficult task, and no operative process known to me gives very great security. It was in the presence of a case of this kind that, after many hesitations, I had the idea of performing an operation which I might call operation for cataract with three knives.

M. D——, two years ago, had detachment of the retina of the left eye, with secondary cataract, synechia of the iris, and complete pupillary occlusion.

Suddenly, there appeared unexpectedly in this eye, an attack of glaucoma, with obliteration of the anterior chamber, disturbance of the cornea, and violent periorbital pain. I performed iridectomy without very much difficulty, pressing the iris very gently back, with the point of the lance-shaped knife.

The antiphlogistic effect made itself felt very promptly, but without improvement of vision ; the lens was, however, opaque. Fifteen days later, the ocular tension increased anew, the anterior chamber was obliterated, and the lips of the iridian coloboma adhered to the cataractous lens.

It seemed clear to me that extraction of the lens should be performed, but the operation, nevertheless, presented great difficulties.

This was what I did: The lid elevator in place, I had the eye drawn downward by an assistant, who held the fixation forceps near the lower margin of the cornea. Then, taking a lance-shaped knife in each hand, I buried them both inversely to each other in the sclero-corneal limbus, one at the right, the other at the left, a little above the horizontal diameter of the cornea.

The two punctures were easily made, each of the blades being in opposition to the other. As soon as the point of each knife had perforated the cornea, before touching the iris, I withdrew them both, and by means of a curved cataract knife, sharp on the convex edge, and with a button at the end, constructed by Major, I entered by one of the incisions, came out by the other, and made an incision measuring about a third of the circumference of the cornea.

The cataract was then extracted without difficulty. I even, afterwards, removed the entire capsule with the capsule forceps and thus obtained a very black and very clear pupil.

Two years after this operation was performed on this patient, no further attack of glaucoma had been produced.

I was astonished myself at the facility of this operation which I had expected to find very laborious.

I have had to perform the same operation upon an identical case of secondary cataract with detachment of the retina, complicated with glaucomatous pressure and complete obliteration of the anterior chamber.

The operation was carried out exactly as the former.

The anti-glaucomatous effect was excellent but the pupil was ultimately obliterated as so often happens in cases where the nutrition of the eyeball leaves much to be desired.

In a case of subacute glaucoma with complete obliteration of the anterior chamber, this same process allowed me to perform a large iridectomy which had a perfect immediate action and restored sufficiently good sight to the eye.

In iridectomies performed under these circumstances, it goes without saying that the incision of the cornea should not have so great an extent.

In two cases of adherent leucoma in which the iris, thinned with tension, was completely attached to the cornea, I have been able to perform iridectomies very successfully when by the old process I had, in identical cases, only slovenly or too slight iridectomies.

I cannot say too much in recommending a trial of this operative process, which is more complicated in the description than in the execution.

BLOOD POCKET IN THE ORBIT WITHOUT SUFFLE NOR PULSE; LESION OF THE CORRESPONDING FRONTAL SINUS.

By Dr. **du GOURLAY** (Dinard).

Mlle. H——, aged twenty-six, laundress at le Talar (Saint-Malo), of lymphatic temperament, but in good health, came to consult me in October, 1890, for a swelling situated in the internal angle of the left orbit behind the lachrymal gland which it crowded forward before it.

The lower lachrymal canal was split open through its whole length, but the sac, flattened by the pressure from behind forwards refused for some days to allow the entrance of a Bowman's probe. This tumor, which lifted the eye-lid in a very apparent manner, had revealed itself for about six months by symptoms whose progression was constant. There were crises of headache which began with a sensation of tension in the orbit and followed the course of the nerves, spreading over the whole left side of the head. In addition to these paroxysmal crises vertiginous symptoms had appeared which forced the patient to stand still on pain of losing her equilibrium and falling.

Besides this protuberance at the internal angle, of about the diameter of a large hazel-nut, a slight degree of exophthalmus was observed, a little oedema of the conjunctiva in the cul-de-sac, a few vessels near the equator of the eyeball and a certain degree of external strabismus. Slight diplopia was also found but it was difficult to manifest. $V = 2/3$. Nothing noteworthy in the fundus oculi. The contours of the papilla were less distinct than on the opposite side.

Touch gave the sensation of a fluid, fluctuating tumor, hardly depressible and completely irreducible. It was in every way the feeling of a bladder well filled with water. No pulse and no fluctuation was preceived by the finger.

The stethoscope being applied to the protruding point revealed no suffle nor sound of any sort.

On palpating the contours of the orbit as deeply as possible there was found in the internal third a slight projection of the wall of the frontal sinus which, on the whole, did not seem to be as deep as that of the other side.

The direct result of this examination was that there existed a fluid tumor, but what was its nature and to what cause should the lesion be attributed?

On closely questioning the patient I finally found that five years before she had been violently struck in this region by the horn of a cow, resulting in an ecchymosis which had extended to both lids and a part of the cheek.

The absence of all redness, of any puffiness of the skin, of sharp pain or pain on pressure eliminated the idea of suppuration. There remained for discussion the presence of blood or of fluid secreted by a cystic pouch or by the sinus in the wall of which I had found a projection, vestige of an old fracture. This latter hypothesis seemed to be plausible, but a puncture made with a small Pravaz syringe which was instantly filled with rich venous blood, overturned this hypothesis and definitely made the diagnosis. Before withdrawing the needle I assured myself that its extremity moved freely in all directions. There was then a cavity, a veritable blood pocket. Eight days afterwards, by means of a Dieulafoy aspirator, I completely emptied the pocket which contained about 30 c.c. of venous blood, in no way altered and was thus able to explore somewhat more deeply the supero-internal portion of the orbit but found nothing more than the projection already discovered. A quarter of an hour afterwards the tumor was filled again.

There was then a blood pocket containing fresh blood which was renewed just as in aneurysm although it was impossible on repeated examinations to discover any souffle or pulse. If, then, this cavity was not formed by the walls of a dilated vessel it at least communicated with one or several small vessels which poured their contents into it.

As the patient became more and more subject to headaches and vertigo so that work was impossible, she begged me to remove as quickly as possible this evil which made such rapid progress. October 25, 1890, I laid bare the tumor making a crucial incision in the skin and dissecting four flaps and incised the pocket freely the walls of which were nucreous and bluish. There was immediately a flood of blood bathing the cheek without jet or intermittences. Introducing a finger into the orifice I found that the cavity extended to the fundus of the orbit (to 5 or 6 centimetres from the orbital border). It was lined with a soft membrane without apparent solution of continuity even over the slight projection in the wall of the sinus which was clearly demonstrated. The hemorrhage was not great and did not interfere with the examination.

After free irrigation with $\frac{1}{500}$ bichloride I applied Piazza's fluid to the entire cavity, packed it well with iodoform gauze and applied strong compression by means of a tampon of absorbent cotton and a flannel bandage.

The bandage became slowly soaked with blood but I was soon convinced that there was no danger from hemorrhage.

On the evening of the third day the patient had a chill followed by a rise of temperature to 39° c. and the next day I removed the bandage. The cavity was carefully cleansed and there was but little bleeding. A similar dressing was again applied and 0.50 grammes of sulphate of quinine administered for three consecutive days. Cessation of the fever; bandage every two days. On the twelfth day there was a fairly abundant hemorrhage but it was readily arrested by packing.

Four months later the cavity was filled with healthy granulations, but the small triangular projection of the sinus had increased. Its summit was visibly detached pressed forward by a tumor originating in the cavity of the sinus.

A second operation was necessary.

In April, 1891, without chloroform, I made a large incision parallel to the orbital border in order to reach the wall of the sinus and the projecting piece of bone still adherent by a few fibrous bands and seized it by its summit. This osseous lamella was in the form of an isoceles triangle the base of which measured a little less than a centimetre and the sides a little more. I removed it with strong pliers by fracturing the base. With a small gauge and bone forceps I broke the anterior wall of the sinus in order to lay bare as large a portion as possible of the polypoid mass which filled the cavity. I removed as much of the latter as possible with curved scissors and the rest was destroyed as much as it could be with the thermo-cautery. The sequellæ of this laborious operation were most satisfactory.

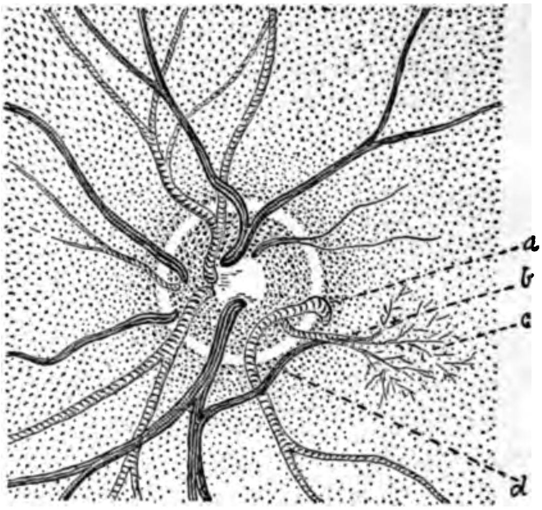
I then contented myself with keeping the cavity open, packing it every other day with iodoform gauze. More suspicious swellings were soon produced and were destroyed with the thermo-cautery. I was also obliged to destroy some fairly large swellings which formed on the floor of the orbit and, in short, was not able to let the opening close before the first of the year 1893, but since then recovery has been perfect. Vision was preserved until 1894 but then the lens began to loose its transparency and now it has become quite cloudy. Luminous perception is, nevertheless, excellent and the deformity resulting from this double operation is but slightly apparent. From time to time, twice since 1894 there has been an attack of phlyctenular keratitis in this eye, which was readily cured.

REPORT OF A CASE OF ANOMALOUS RETINAL ARTERY.

By Dr. **L. R. CULBERTSON**, Zanesville, Ohio.

Numerous cases of persistent hyaloid artery have been reported, but reports of other anomalous arteries are very scarce. Persistent hyaloid artery, as we all know, is the remains of a foetal artery which is given off from the arteria centralis retinae.

In the case I have to report the anomalous artery is not given off from the arteria centralis retinae, but emerges from the edge of the outer and lower quadrant of the left disc and after passing over the cupped edge of the disc lies on the disc and making a curve downward on the same quadrant passes off and follows the inferior temporalis vein to its finest ramifications. While it passes over the disc it receives a small arterial branch (b), which receives numerous fine vessels arranged like the venae vorticosae of the choroid, but which appear to contain arterial blood and probably come from the short ciliary arteries of the choroid. This short artery (b) gives off a short branch (d) which passes over to and unites with the inferior temporalis vein and is dark and appears to contain venous blood. If this small branch (d) does contain venous blood then the branch (b) must carry both venous and arterial blood; or else there must be a small branch in the delta (c) that carries the venous blood into the vasa vorticosae of the choroid. The main artery (a) comes from the short ciliary arteries which supply the choroid, and which pierce the sclerotic just at the entrance of the optic nerve sheath.



This artery may have performed the function of the hyaloid artery of foetal life, but of this we have not the slightest evidence as it does not pass into the vitreous and does not present the appearance of persistent hyaloid artery, I have examined the eye grounds of a number of horses and find that they have no central artery or veins emerging from the disc but that all the arteries and veins enter and emerge about the circumference of the disc.

The superior and inferior nasal arteries and veins are in their normal positions as are likewise the superior temporal and macular arteries and veins. The superior temporal artery is quite small and passes directly forward instead of outward. The inferior temporal vein is in normal position.

In conclusion I would say that this man is fifty-four years old, and is almost totally deaf in both ears and has optic neuritis in both eyes much worse in right eye. Both discs cupped (atrophic) result of meningitis he had seven years ago. The interference with circulation (ocular) caused by neuritis may have made the anomalous artery larger than it would have been had he not had neuritis.

II.—REPORTS OF SOCIETIES.

CONGRESSES

FRENCH OPHTHALMOLOGICAL SOCIETY.

Fourteenth Annual Session held at Paris from the 4th to the 7th of May.

Binocular Vision; its Loss and Recovery.

DR. MEYER read the paper: Binocular vision is a function of animals possessing a visual field common to two eyes. In this field their optic axes are directed to the point of regard, either parallel or convergent.

Normal vision with both eyes has considerable advantage over monocular vision. It controls absolutely the movements of our eyes, the complete harmony of which is assured only by this control; it increases the extent of the field of regard in which vision can act; and finally, it furnishes the essential factors for the immediate and accurate perception of the dimension of depth, for the perception of solidity.

Its influence upon the movements of the eyes results from the absolute necessity of directing these movements so that the lines of regard will always cross at the same point, so that the same point will always form its image upon the centres of the fovea, an essential condition of normal binocular vision.

The process of simple vision, when the images are formed upon the clearest points of vision (identical points of the two retinæ) rests upon an innate faculty, or results from the early acquired experience that the two images always correspond to a single object.

This is true for all points of the retinæ which like those of the fovea, are projected upon a single point in space and which are called "identical points." While the other points spoken of as non-corresponding points causes diplopia.

But the double, constant images of all objects situated before or behind the point fixated by the eyes pass unnoticed and only attract attention when they come from the object at which we are looking. It is only the double image of this object that gives much annoyance and it is to avoid this that we seek to always direct the eyes so that the visual lines will cross at the point of regard.

We also observe an absolute dependence of the two eyes, one upon the other, in their movements and a constant harmony in their associations, even in the minutest details, even in elevation and lowering.

Not only in relation to the direction of projections, but also in their movements, Hering considers the two eyes as a cyclopic eye and compares this to a double team which is easily directed, and which the will manages as though it was a single organ. As to the extent of the visual field, he enlarges it notably in the horizontal plane by the use of the two eyes as compared with monocular vision; he is at pains to insist upon the capital importance of eccentric retinal impressions in relation to our orientation.

When we look with the eye, all the objects which fill the visual field seem, as long as the head and eyes are held immobile, to be ranged on a plane surface and present differences only in two dimensions.

For very great distances, as when one looks at the sky or any other collection of very distant objects, it makes no difference whether we use one or both eyes, for neither one nor both will enable us to judge of the dimension of depth.

The use of the second eye gives us a new element of sensation of value only when its line of vision strikes that of the first at a limited distance. The angle of convergence then formed by the two lines of regard determines the distance at which we project the point fixated by the two eyes.

It is by the movements of convergence, necessary for points situated at different distances, that we know whether one point is situated before or behind another, and what is the distance which separates them.

It is the movement of convergence which furnishes an accurate basis for our judgment of the third dimension of points situated in different planes and belonging, it may be to different objects, it may be to the same (vision of solidity).

To this element all the means which monocular vision possesses of judging of the distance in depth which separates objects, such as accommodation, previous knowledge of their size and form, brilliance, shadows, etc., are accessory.

But the means, more important and more exact than all these, which can give us the idea of a third dimension and vision of solidity rests upon the conparison of the perspective image which an object gives, when we view it from different standpoints.

If then, it is by the convergence and by the combination of different images furnished by the two eyes, that we arrive at an appreciation of the differences of distance which the different points of an object present—an appreciation which determines the perception of the third dimension of objects, the conception and measure of relief—it is only, however, by constantly bringing the lines of regard to bear upon the different points and outlines of the objects, so as to receive successively upon the identical centers of the force the images of all these points. As Brücke has demonstrated this constant displacement of regard gives to the conception of depth all the fineness and accuracy with which ordinary natural vision distinguishes the slightest differences of level or relief in objects.

Although the movements of the two eyes to determine the contours and the most important points of the oject which we desire to know play an important role in the vision of solidity, it is also certain that the third dimension can be recognized with accuracy without any ocular motion. The experiments of Dove and Hering which consist, the first in making an electric spark pass, the other in allowing marbles to pass before and behind the points fixated, demonstrate this.

Loss of Binocular Vision.—Loss of a normal binocular vision can show itself by the appearance of diplopia ; this disappears when either eye is closed and this can be distinguished from monocular diplopia. In other cases to determine the presence or absence of diplopia, one avails himself of various means, of which the simplest consists in finding, after having determined the vision of each eye, the state of binocular fixation, the normal maintenance of which is the essential condition of binocular vision. Another means consists in placing before the eye plates of red and blue glass and having the patient read the letters of red and blue ; if all the letters are immediately seen, vision is binocular.

We may also have the patient read, while we interpose between the eyes and the printed page a pencil or similar object, perpendicularly to the lines. If vision is binocular, this object will not conceal any of the letters on the page ; but it is necessary to take care that the head and pencil are not moved.

To assure one's self that binocular vision really gives the conception of solidity and of relief, it is necessary to employ the stereoscope, of which the most common form in clinical use is that of Holmes. By the use of this instrument we can observe: 1st. If the two eyes see the stereoscopic images at the same time or alternately, that is to say, whether there is stereoscopic diplopia: 2d. Whether the two eyes can combine and unite the two images: 3d. Whether there is a perception of relief, a perfect vision of solidity.

A very rational procedure for judging of the existence of binocular vision is provided by Hering's experiment: The eyes are placed at the end of a hollow tube and directed to a fixed point in the tube, while balls are allowed to fall sometimes in front of, sometimes behind the point fixated. Those who enjoy binocular vision can tell with great accuracy where the balls pass, but if one eye is closed, or if binocular vision is lacking, they can only guess and so make about 50 per cent. of errors.

If monocular vision does not deprive those who have never enjoyed binocular vision of solidity and appreciation of depth, the loss of binocular vision has unfortunately very different results in those who throughout life have employed it to judge of relief and of distance.

There is in the first place, the suppression of the control which it exercises upon the perfect harmony of the movements of the two eyes.

In the second place, the loss of binocular vision, when it is the result of the loss of sight in one eye, produces a very considerable limitation of the visual field in the horizontal plane. It is not necessary to emphasize further the influence which this limitation must exert upon the facility of our orientation and our movements.

If we seek the causes which can impair the normal exercise of binocular vision, we find them either in changes of the functions of sight, or in disturbances of mobility. As to the functions of sight, the cause of the loss of binocular vision may lie either in vision itself or in the visual field.

1. As to the visual field, it has no influence so long as the normal central vision, that is to say, the point of regard corresponds with that of the other eye, as in orientation.

2. If it is certain that the complete, or almost complete suppression of one eye destroys at the same time binocular vision, it has also been demonstrated that vision does not need to be normal to render binocular vision possible. Van der Meulen has reported the results of experiments made upon himself and a number of his friends, by plac-

ing before one of their eyes spherical or cylindrical glasses, the glasses more or less roughened or darkened. In this way he has demonstrated that anisometropia of even 6 D does not disturb binocular vision, that to destroy it it is necessary to increase the difference to even 13 D, and in some to even 20 D. As to the monocular astigmatism produced by convex cylindrical glasses, the strongest of these placed before the eye with the axis horizontal, do not disturb binocular vision, while even a weak glass with the axis vertical disturbs it considerably. By lessening vision of one eye by the use of a roughened glass, we can lower V even to $\frac{1}{6}$ without disturbing binocular vision, and even to $\frac{1}{50}$ without completely abolishing it.

From the researches of de Greeff and Van der Meulen it follows that anisometropia even of the highest degree and without correction does not impair binocular vision so long as there is muscular equilibrium of the two eyes. The same is true of diminution of accomodation.

Since the essential condition of binocular vision lies in the reception of the image of an object upon the centre of the fovea of each eye, and since that condition can be fulfilled only when the harmony in the associations of the movements of the eyes is complete, as soon as this harmony is disturbed, whatever the cause, normal binocular vision ceases to exist in the whole or in part of the field of regard, either with or without diplopia.

The generally accepted explanation of the absence of diplopia in strabismus consists in supposing that the attention is entirely focused on the visual field of the eye normally directed, and neglects that of the other the more readily as it is rather prejudicial than useful for the clear vision of objects observed.

This acquired faculty of setting aside a visual field, of disregarding or suppressing it, is exercised first upon the point of the displaced retina which receives the image of the object fixated by the other normally directed eye. By reason of the variability of the angle of strabismus this action extends liitle by little to the neighboring parts, especially in the horizontal plane, while the superior and inferior portions of the retina for a long time remain capable of producing diplopia.

More difficult to explain are the cases of periodic strabismus, in which binocular vision fails not only when one eye deviates, but even when both eyes are in exact fixation. The use of prisms and the stereoscope easily excites in these cases a vision alternating at times with great rapidity, but neither diplopia nor fusion of the two images.

The true explanation is probably that in these cases, whatever be the position of the eyes, there is no binocular fixation despite the appearance to the contrary.

To the change in visual functions or in motility which can endanger or destroy binocular vision it seems to me we ought to add a third series of causes, the reality of which does not appear doubtful to me, although they have not been mentioned, so far as I know, and although I cannot apply them to the known facts. These are the psychic causes.

Binocular vision is a cerebral act, a judgment of our sensorium based upon and supported by a certain number of perceptions transmitted to it through the nerve channels, either of the organ of vision or of regions which by memory store up images of representation or conceptions previously acquired from experience.

If we were to examine from this standpoint children with cerebral affections, hydrocephalus, idiocy, malformation of the cranium, etc., or adults suffering from various forms of cephalopathy, general paralysis, or similar diseases, even when vision is adequate and there is no disturbance of motility, it is not doubtful that we would find many cases where binocular vision is lacking.

Recovery of Binocular Vision.—The means employed to secure or reëstablish binocular vision ought to be directed first of all against the conditions which oppose the performance of this function. These conditions sometimes lie in absence of harmony of the associated movements of the eyes, sometimes in the alteration of visual functions, or in both causes together, so we classify the remedial measures in the same way.

Optical Causes.—For ametropia the indication is clear: it must be corrected by appropriate glasses, so that the patient may not be tempted to neglect or sacrifice normal binocular vision to the necessity of securing clear vision. In hypermetropes this indication holds good at an early age, as soon as the child finds it necessary to fix steadily. On the other hand in myopia, the necessity of prescribing corrective glasses comes into question only when it exceeds a degree which permits working at a convenient distance.

In the cases where the weakness of vision in the eye has prevented the establishment, or caused the loss of binocular vision, the possibility of successful treatment depends, in the first place, upon the degree of this weakness and the possibility of improving it to a degree compatible with the exercise of binocular vision. Although this degree varies in a certain measure with the individual, we can take from $\frac{1}{10}$ to $\frac{1}{12}$ normal vision as a limit below wnich we ought not to expect a favorable result. This limit, indicated by the results of experience, has been corroborated by the researches of Greeff, already cited. When, after correction of its ametropia, one eye is more amblyopic than the figures given, we must make sure whether we cannot improve vision by appropriate means.[1]

Unless we have to deal with an incorrigible amblyopia, it is always indicated to attempt to improve vision to a degree compatible with binocular vision.

The means which I prefer to employ consists in visual exercises with convex glasses. The better of the eyes, the one which the patient habitually employs, being closed, the other is led to fix and view through a glass letters of such size that the patient can easily recognize them.

If the letters are arranged in words and lines, in order that he may not guess at them, it is necessary to have him read backwards or to employ a language unknown to the patient.

Those in whom $V = \frac{1}{10}$ are not likely to recover binocular vision ; but we can recognize as favorable cases those in whom it is possible to excite diplopia.

In disturbances of motility it is necessary to distinguish between deviations of palpable origin and others. It goes without saying that paralysis demands the treatment indicated by the cause which produced it.

In the cases where paralysis remains stationary, we can employ electrical currents to excite passive movement of the paralyzed muscle, or we can employ the diplopia to excite contraction of the weakened muscle.

Surgical interference comes in question only in long stationary cases where all means thus far indicated have been employed without effect. So far as binocular vision is concerned, it is of use only when there is binocular vision in a perephiral part of the visual field, and the object of operation is to secure it to the central part.

Regarding deviations of non-paralytic nature, the therapeutic indications vary with their nature and their period of evolution. Periodic convergent strabismus usually due to hypermetropia will be corrected by convex glasses. For the periodic divergent strabismus of children exercises with prisms for nasal refraction will be found of use.

In permanent strabismus we seek to determine whether the deviating eye has preserved the faculty of fixing exactly. In this case we may hope to reëstablish binocular vision by operative correction of the deviation. This correction ought to be followed by orthopeic exercises designed to complete the treatment and assure its success by a binocular vision as perfect as possible. For that purpose stereoscopic exercises may be employed

Although we seek most carefully to reëstablish binocular vision and take so much pains to attain it, it has but little advantage over monocular vision except that it determines a complete and final cure of the strabismus. This is all that we are sure of obtaining.

DR. LANDOLT.—The disposition to binocular vision is innate in the species. It will establish itself if there is not too great a difference between the eyes, and if the motor apparatus is susceptible of favorable developments. In the contrary case binocular vision will not occur, or once established, it will fail more or less when the essential conditions fail.

We can establish or reëstablish binocular vision if we succeed in fulfilling the conditions necessary to its development; improvement of vision in the impaired eye by correction of its optical defects and by visual exercises; regulation of the movements of the eye by orthopeic exercises, and of the influence which accommodation exercises upon convergence (positive and negative), or finally by means of surgical interference.

We will often have the satisfaction of seeing binocular vision appear almost spontaneously, as soon as the field is prepared for it. As a rule, we will get on more surely by instituting at the very beginning and maintaining throughout treatment and ever afterward stereoscopic exercises. It is thus we teach the individual the essence of binocular vision; the fusion into one of the simultaneous impressions of the two eyes and its consequence, the appreciation of the third dimension of relief, and the precise distance of objects situated in the visual field.

DR. MASSELON.—Regarding the question: "Is amblyopia itself the cause or consequence of strabismus?" having had occasion to examine, in the Communal schools of Paris, a large number of children in the beginning of strabismus. I have been struck with the relatively good vision which they presented at this period, and I have concluded that in the great majority of cases the amblyopia is the result of strabismus.

Regarding binocular vision in muscular paralysis, Dr. Meyer says in his interesting report, that there is "diplopia in all that part of the visual field where the action of the affected muscle is lacking." In reality the diplopia is much more extensive in these cases, and encroaches considerably on the field of action of healthy muscles, and that even at the beginning, at a time when there can be no question of contracture of the antagonist. This fact, already noted by

Dr. Landolt in a very ingenious study of the field of regard, could be foreseen by considering that a paralyzed muscle loses its tonicity and that the eye always tends to be drawn considerably to the side of the healthy muscle, this action showing itself more or less in the whole extent of its excursion. To show itself beyond the limit of action of the affected muscle, the diplopia does not require a complete paralysis, and it can be observed at the very beginning in very incomplete paralysis.

DR. ANTONELLI.—Among the causes of loss of binocular vision it is important to note asymmetry of the cranium and face in children. This vice of conformation stands in relation, at times, with both groups of causes which threaten simple binocular vision, alterations of the visual function and disturbances of motility.

Defective development of one side of the head is almost always associated with malformation of the corresponding orbit. With the ophthalmometer of Javal, I have observed that, almost always, the eye of the less developed side is lower and lies deeper in the orbit in relation to its congener, and is more or less asymmetrical with defective vision. In the interest of simple binocular vision the motor apparatus of the eye may compensate for the difference in level of the eyes, but the simultaneous action of anisometropia renders strabismus almost inevitable in children with very pronounced cranial asymmetry.

DR. DIANOUX.—Landolt and Masselon having expressed a part of what I wished to submit to the assembly, my task is very easy. I will confine myself to two observations. I will at once call attention to an omission in the enumeration of the causes of loss of binocular vision; it is the influence of the occlusion of one eye in very young children, even when it has not been prolonged. I have seen convergent strabismus supervene in many cases, where the occlusion of one eye was necessitated by keratitis, but I have also seen two cases where the cause lay outside the cornea; thus in an abscess of the internal angle the resulting strabismus, which never recovered, could be attributed only to the diminution of vision in one eye. In this we can see only the unfortunate ease with which a habit attended with pain is abandoned. If occlusion is unavoidable, it is prudent to bandage both eyes.

I can only confirm the opinion of Javal; that the stereoscope permits the restoration of binocular vision after, and it may be I ought to say only after tenotomy. I prefer especially the folding stereoscope, with which it seems to me much easier than with the red glass itself to excite diplopia and finally fusion. The simplicity of its mechanism lends itself admirably to the use of the instrument. It is easily carried in the hand, and the strabismic can test himself at any time, even secretly, if the eyes are in good condition.

Brewster's stereoscopic and the ingenious cards of Javal are means of perfecting the process, but they require an intelligence and a perseverance rarely met with.

The physician must have confidence in his patient; then success is assured. The recovery of binocular vision is a question of will.

Dr. Vocher.—Anisometropia does not cause the loss of binocular vision, but rather the complete correction of this anisometropia.

Dr. Martin.—Nothing is more difficult than to reëstablish binocular vision, but it is also difficult to destroy binocular vision when it exists. To render glasses of complete correction endurable, it is necessary to use lenses of increasing strength, increasing a half to one dioptre. For the improvement of strabismic amblyopia, Meyer advises the use of convex glasses. I think that it is useful to combine them with cylindrical glasses, when, as often happens, astigmatism is present.

Dr. Ostwalt.—The faulty position, the inclination of the head in children, can contribute to the failure of development of binocular vision. Meyer advises preventing the inclination of the body by a strap fixed on the back of the chair. I present to you a little apparatus designed by Muller which consists of a spectacle frame with a celluloid shutter, which in the right position, is held horizontal, while the inclination of the body makes it take a vertical position, preventing vision, and thus forcing the patient to maintain a correct position.

Dr. Javal.—There is certainly a divergence between our theories and that of Helmholtz, as a result of the intervention of Darwinism, but I do not wish to insist upon the theoretical side, and confine myself to the practical. I am not in accord with Meyer in the use of convex glasses to improve strabismic amblyopia. I prefer the occlusion of the sound eye, during rest, for example, the child being forced to make an effort to see what it takes. It has the advantage of making complete correction of ametropia, if such exists.

The reëstablishment of binocular vision is a tedious undertaking, but we can succeed in the great majority of cases.

Dr. Parinaud.—(His response forms a monograph which appears in this number).

Note Upon the Use of the Stereoscope for the Re-establisment of Binocular Vision.

DR. REYMOND (Turin).— For the reëstablishment of binocular vision, we as yet possess no well defined and coördinated system ; we often set about it with isolated efforts or blind gropings.

I. That binocular vision may be established it is necessary that the two visual axes converge to the same point in the plane of regard. This condition can be fulfilled upon both sides of this plane in this strabisums (convergent), in subjects possessed of good vision. Correction, even incomplete, permits them to see stereoscopic relief by enlarging the area of binocular function.

In paralytic strabismic deviations, stereoscopic vision is still preserved in the zones of the field of regard which come from the side opposed to the seat of the paralysis ; and this fact may be used in the treatment of recent paralytic deviations. For this purpose the subject must incline the axis of the stereoscope from the side where he has no diplopia. When relief is observed, the axis of the stereoscope is gradually straightened toward the diplopic zone, and this process is arrested as soon as diplopia begins to show itself. By thus preserving the exercise of the binocular function, the peril of neutralization and the formation of a permanent optic strabisums is avoided.

II. Neutralization is the greatest obstacle to the education of binocular vision. The strabismic does not collect the impressions received from that part of the visual field which is comprised in the binocular field. After operation it is important to combat neutralization as much as possible. Doing this, we can often completely correct the remainder of the deviation. For young strabismics education seems to me the preferable treatment.

For many years I have employed a little contrivance of Baïardi. It is a simple round disc of blackened metal, its periphery pierced by several apertures, which can be made to turn more or less rapidly like a wheel before the eyes. In rotating, the openings of the disc correspond successively to one eye or the other. The disc can be placed before one eye alone, and then the successive impressions act upon this eye, while the other receives a continuous impression. When the disc covers both eyes at once, the openings can be so disposed as to obtain successive impressions which fall simultaneously upon both eyes, or the successive impressions may alternate in the two eyes.

This apparatus finds two important applications in the education of binocular vision and in the recovery of the perception of diplopia which implies the cessation of neutralization.

III. When a strabismic, with the aid of a stereoscope, has acquired the faculty of receiving simultaneously, without confusion, the impressions furnished by each of his monocular visual fields, he is then apt to see binocular relief. The process of successive and alternating impressions has then appeared to me to be very useful. At first the disc is turned slowly, then more and more rapidly until the two impressions, the two stereoscopic images, fuse into a single impression by juxtaposition. The neutralization of the image of the deviating eye can still lead to error. But the subject himself will recognize the phenomena of neutralization, if he is first made to note that the pointer and lines are arranged in a different order to the stereoscopic screens for right and left sides.

IV. Stereoscopic exercises tend in general to awaken the remembrance of binocular relief by presenting an illusion of it. To teach one to see binocular relief, we can employ with advantage some observations which have made known the coördinations from which springs the perception of binocular relief; as a simple example, I will cite to you the experiment of Hering, which I often take as a point of departure for the analytic education of coördinations. Moreover, the position in which each visual field is seen in space can be modified by education. In the strabismic the two visual fields do not arrange themselves at one time on a line identical with the plane of regard; so vision of binocular relief is impossible.

Fluxion of the Conjuctiva.

DR. TROUSSEAU (Paris).—I have given the name of fluxion of the conjunctiva to a rare affection which I have observed in two arthritic and arterio-sclerotic individuals. There is an active hyperæmia of the conjunctiva, coming on rapidly, without appreciable cause, and disappearing in the same way, the crisis occurring almost always at night, lasting two or three hours, to return on the following day once or twice, and ceasing after a variable time. Complete recovery is the rule.

Toward the middle of the night, the patient is awakened by a sensation of heat, smarting, and weight in the eye, without real pain, and at the same time there is free lachrymation. The eye, half-closed, is deeply injected, the bulbar conjunctiva is very red, the contracted pupil is immobile, while the tension of the globe remains normal.

The affection cannot be confused with conjunctivitis, scleritis, facial neuralgia or glaucoma. It is a simple active hyperæmia of the conjunctiva, fugacious and intermittent, unaccompanied by other ocular trouble, healing completely after some recurrences, and once having disappeared, leaves the eye sound.

Without wishing to go into the exact role of the trigeminus, or the facial, as to the mechanism of the crisis, I think that we can consider the fluxion of the conjunctiva, which I have described, as belonging to the initial period of arterio-sclerosis, which is characterized by various vaso-motor disturbances.

Drs. Dianoux and Trosseau.—Have never observed concomitant coryza.

Dr. Boncheron.—These fluxions of the conjunctiva must be considered gouty manifestations. We observe in the gouty analogous phenomena in the ciliary region. We see occurring in them the phenomena of cyclitis, as fugacious as the fluxion of the conjunctiva.

Different Chemical Reactions in the Nuclei of the Cones and Nuclei of the Rods in Retinæ Exposed to Colored Rays.

DR. LOUIS DOR (Lyons) presented microscopic preparations of the retinæ of frogs stained with Biondi mixture.

In the retinæ of frogs kept for several hours in darkness the rods, the nuclei of the cones and the rods, the granules and the multipolar cells always take the same stain.

If the frogs have been exposed to the sun, the stain is in general the same, but much paler, if the staining time has been the same.

If the frogs have been exposed to red light, we can see that in the same preparation, the nuclei of the cones and some granules have taken a certain tint, which varies according to the way in which the staining has been done, while the rods and their nuclei, as well as other granules, have taken an altogether different tint; thus we can see preparations where the nuclei of the rods are stained red-brown, while the nuclei of the cones are colored lilac; in other preparations the nuclei of the rods are green, while most of the granules and the nuclei of the cones are stained a pale violet. These differences of stain may depend upon the fact that Biondis reaction is extremely difficult to control and that the slightest differences in technique give considerable differences in the final results, but the fact that in the same preparations certain elements take one color, while others take a different one, proves that these elements themselves have different chemical reactions. However this action does not occur in retinæ exposed in darkness or to diffuse light; with blue light we can see differences in color between the granules and the nuclei of the rods and cones, but there is no difference in color between the nuclei of the rods and those of the cones. These facts show that red light acts chemically in a different way upon the nuclei of rods and those of the cones, and consequently that the function of the cones is closely related, as we believe, to color vision.

Law for the Prevention of Blindness Resulting from Ophthalmia Neonatorum.

DR. LUCIEN HOWE (Buffalo).—I think that the great proportion of blindness due to ophthalmia neonatorum requires a law applicable in all countries.

Taking France as an example, we find in 1883, altogether, 38,722 blind. In 1889, the average of adults become blind from purulent ophthalmia was about 40 per cent. To be very moderate, let us take 30 per cent.; that will give us more than 11,500 blind in France, as the result of ophthalmia neonatorum.

Let us add a word as to what this costs the State. At the institution for the juvenile blind, every pupil costs 1,350 francs a year, the landed property and interest upon their property not included.

However diverse the opinions as to methods of treatment, we all agree that the proportion of eyes lost will be almost nil, probably not more than 1 per cent., and it may be not more than ½ per cent., if the child is brought to a physician immediately at the beginning of the disease.

But how can this be brought about?

By pamphlets, giving advice to mothers, such as the Valentine Hain Association for the Care of the Blind in France, has distributed for the past six years? Or will it be better to address first the midwives and nurses? No. In every country where the State contents itself with this procedure, the midwives neglect the advice, or reject the pamphlets with reading them.

Or is it sufficient to require doctors and midwives to report to the officials purulent ophthalmia like other contagious diseases, as soon as the diagnosis is made? No. For if we wait until the diagnosis is assured, especially by midwives, it is usually already too late.

The only remedy is to require midwives or nurses, or any other person charged with the care of an infant, to report the case just as soon as there is the least suspicion of the disease.

Every country has some law of this sort, but in the United States that the law is very simple, yet, without doubt, severer than in any other country. It may be worth while to cite it:

1. If a midwife or nurse, having charge of an infant, see that one or both eyes of the child are inflamed or red, at any time within two weeks after birth, the midwife or nurse having charge of the child must report the case in writing, within six hours, to the health officer or any person legally practising medicine in the city, town or district, where the parents of the child reside.

2. Every violation of this law shall be punishable by a fine of

$100 or more, or imprisonment for six months or more, or both fine and imprisonment.

3. This law went into force September 1, 1890. Certain slight modifications have been made in the State of New York, but it has already been adopted by eight other States, having a total population of more than 20,000,000.

On the Extraction of the Transparent Lens as a Prophylactic Measure in Progressive Myopia of High Degree, and Detachment of the Retina.

DR. VACHER (Orleans).—(Will be published in extenso).

The Operative Correction of Myopia of High Degree.

DR. PFLUEGER (Berne).—After a series of eighty operations on myopia of high degree, Pflueger presents in tabular form the cases in which the curvature of the cornea was measured before and after operation, at various intervals from the time of operation. There are forty-six of these cases. The measurements of the cornea allow one to calculate in advance the optical effect of aphakia in myopia of high degree, much more exactly than with formulae applicable to the normal eye.

The clinical observations show a very satisfactory agreement between the clinical results and those of theory, as they are calculated in accordance with the formula of Eperon, or that of Freherning, or that of Stadtfeld. There will always be insurmountable difficulties in certain cases; these are due in the first place to the impossibility of determining accurately the degree of pronounced myopia, and in the second place, especially to the operative astigmatism.

Dr. Abadie.—I think that operation should be reserved for the cases in which there is disorganization of the fundus of the eye, from macular choroiditis. I take great care not to apply it to cases of myopia of high degree with good vision.

Dr. Chibret.—Every year the number of advocates of operation for myopia of high degree increases. My operative procedure is a little different from that of Vacher. I make a large incision with the cystitome, then after four or five days, when the crystalline masses have become opaque, I renew the corneal incision and evacuate the masses with the aspirating syringe, which I have presented to you. In two cases out of three I have not had to do secondary operations.

Dr. Parinaud.—I think it is necessary to make some reservations as the favorable influence which extraction of the lens exerts upon the lesions of the fundus of the eye.

Some time ago I observed a patient who in his youth was operated upon for congenital cataract by de Wecker. At first his aphakia was corrected by convex glasses; then myopia developed. He wore glasses of less and less strength, and even concave glasses for vision at a distance. It has actually produced detachment in one eye. So then, despite the early extraction of the lens, myopia developed, and has been complicated by lesions of the deep membranes.

Dr. Galezowski.—Extraction of the lens can be made in cases of myopia exceeding 15 D, when there are opacities of the lens or when changes in the choroid show themselves.

Dr. Masselon.—I have endeavored to follow myopes who have been subjected to extraction of the lens, and I have seen them develop choroid lesions in the same way as non-operated cases.

Dr. Koenig. –When I conceived the idea of this operation in 1888, I was ignorant of the fact that it had a French as well as an ancient origin, as Vacher has told us. This bit of history preserves all the interest, since a century had passed up to the time of my memoir. But to-day this operation enters more and more into current practice, by reason of its results, the chief of which are improvement in vision and suppression of efforts of accommodation. If we accept the theory of accommodation in the myope, which I have propounded, it is natural to attribute to it all accidents. We know not how to strike a balance between the dangers of extraction and the benefits derived from it. It is simply a question of rightly selecting the cases of myopia in which extraction is justifiable and adopting a good operative procedure. Such were the conclusions of the work, in which I made an urgent appeal for this operation.

Prophylaxis of Prolapse of the Iris in Simple Extraction of Cataract.

DR. P. NUEL (Liege).—Most often the iris slips between the edges of the corneal wound, because it has first been pushed out of the eye at the time of the evacuation of the cataract. In the usual way of evacuating the lens, it is displaced toward the corneal wound, following an equatorial plane. In this way the lens pushes the iris before it, and leaves the eye wrapped in the membrane. A slight impulse will favor its complete fall.

Nuel avoids pushing the iris out of the eye; he proceeds in the following manner: At the time of evacuation of the lens, he depresses the lower edge strongly by a curette applied upon the eye. The cataract tips over and passes across the pupil which is dilated and the membrane remains in position.

Nuel also strongly advises making a conjunctival flap in extraction of cataract. This flap is a valuable means of coapting the edges of the wound One can apply the conjunctival flap perfectly to the summit of the corneal wound, investing the wound wholly in this membrane.

An obstacle to extraction without iridectomy lies in the catching of the iris by the knife in the anterior chamber. This accident need not be feared when the knife has passed the pupillary field. Nuel accordingly recommends commencing the operation before the cocaine has fully dilated his pupil. Anæsthesia is complete before that time.

A New Operative Procedure for Secondary Cataract.

DR. GALEZOWSKI (Paris) proposes an operation which is performed with two sharp needles, one of which passes behind the iris, the other penetrates from before backward. This procedure avoids the use of the forceps of de Wecker.

Cystectomy and Capsulectomy.

DR. A. BOURGEOIS (Rheims)—The procedure of cystectomy proposed by the author, six years ago, relates to the ablation of a portion of the anterior capsule of the lens (replacing cystotomy) in simple extraction of cataract. The instrument employed is a sort of forceps, so constructed as to pass above the iris without danger of touching it; it is not by tearing that it produces ablation, but by grasping and twisting.

Secondary cataracts, however rare when cystectomy has been done, do still occur, and are often seen to follow traumatic cataract. The best procedure in the extraction of the remains of the capsule, or capsulectomy.

This extraction is not easy, when the iris is intact. The procedure and instrument proposed by the author are planned, without touching the iris, to extract the secondary cataract by seizing and twisting it (not by tearing), after having made a corneal incision of 3 millimetres, or more. The operation is simple, rapid, without shock, and without any loss of the vibrous body.

Discussion.

DR. KALT.—We are all agreed that prolapse of the iris is the danger of simple extraction. I fear that with Nuel's process the cortical masses will not be evacuated.

In the trials of suture of the cornea that I have made (I have used it in above 250 cases), I have observed that the proportion of prolapse is not more than 2 per cent.

Dr. Parinaud.—There are many factors in prolapse, but that which is new in Nuel's communication is the importance which he attaches to the fact that the iris prolapses more easily when it is first pushed out with the lens. I understand that it is easy to deal with a hard lens, as he suggests, but what does Dr Nuel do with a soft cataract?

Dr. de Wecker.—In the operation for secondary cataract I have proposed the use of scissors to avoid traction, and I cannot see the superiority of the procedure of Dr. Galezowski, who tells us that he employs needles instead of scissors.

Dr. Motais.—I think that the procedure of Galezowski is complicated, and that de Wecker's scissors are the more useful of the two instruments.

Dr. Chibret.—I do not understand why simple extraction is systematically done. By making extraction with iridectomy, in cases when the iris is loose, where it is reduced with difficulty after the evacuation of the lens, and finally, in the cases where evacuation of the cortical masses is not complete, we can avoid accidents. I have insisted upon the importance of examining the tendency of the iris and of making iridectomy, when it is necessary.

Dr. Sulzer.—If the theory of contusion as a cause of prolapse of the iris is true, this latter ought to depend, in great measure, upon the size of the corneal incision. An adequate incision ought to approach the half of the circumference of the cornea, and every incision of inadequate size ought to predispose to prolapse of the iris, either primarily or secondarily. My experiences agree with this theoretical consideration. We must always remember that contusion of the iris, which lessens the contractility of the sphincter of the iris, is not the only factor in the production of prolapse. Moreover, the evacuation of cortical masses will be easier and more complete, the larger the incision. It may be necessary to return to the large flap of Daviel.

The Comparative Value of Iodine Treatment in Choroiditis.

DR. VIGNES (Paris).—I had occasion last year to report the satisfactory results which I obtained from the administration of iodine by sub-cutaneous injections in affections of the choroid. Since then I have subjected about 200 patients to this treatment: in some cases its action has been remarkable.

A man of 30 years, suffering from disseminated rheumatic choroiditis, showed $V = 0.1$. He was still in the active stage: every day he was given 1 c gm. of iodine subcutaneously. On the seventh day $V = 0.2$; the fifteenth it was 0.4. Then for a month the patient took 4 c. gms. of iodine daily. At the end of the month vision remained 0.4; the injections were renewed; thirty days later vision had improved on the left to 0.7, on the right to 0.8, and has remained thus for a year. From my researches, it follows:

1. That subcutaneous injections of iodine are of greater efficacy than any other form of treatment in affection of the uveal tract, amenable to treatment with iodine. In certain subjects where the iodine administered by the stomach has been powerless, it has shown itself truly curative.

2. The affections of the uveal tract, with or without participation of the sclerotic, favorably influenced by iodine medication, are the plastic and even fibrinous forms, such as disseminated choroiditis, fibrous irido-choroiditis, and the irido-sclero-choroiditis.

This treatment is sufficient of itself in disseminated exudative choroiditis, in the other two forms it is well to supplement it with the ordinary remedies and especially counter-irritation.

3. It is especially in rheumatic choroiditis that the iodine injections are efficient; they also influence favorably the bacterial forms.

4. In the specific forms these injections are no better than the iodides and are rather inferior to mercury. They are not uniformly followed by improvement in myopic staphyloma.

5. The improvement is shown by the diminution and then the disappearance of muscæ volitantes of the vitreous; and finally improvement of vision takes place.

6. It is especially during the exudative period that medication is efficacious; at the outset of the atrophic period patients also find themselves better for the treatment. It excites the reabsorption of the embryonic elements infiltrated in the marginal parts of the atrophic areas.

7. The daily doses have been O gr. 1 c. gr. to 4 centigr. The reactionary phenomena are insignificant; the injection is followed by a painful but supportable smarting; no abscess nor other accident worthy of attention.

Dr. Chibret.—What vehicle would Dr. Vignes use for the injection of the iodine?

Dr. Vignes.—I use the iodine dissolved in a weak solution of iodide of potassium.

Prognosis of Ocular Tuberculosis.

DR. L. DEWECKER (Paris).—It is well established to-day that many ocular affections incontestably tuberculous have long been considered due to another origin, particularly to specific infection, hereditary or direct. The same is true of certain affections of the articulations and of the osseous system, which have been cured very often without generalized infection of the organism; many patients have preserved an eye or a limb, thanks only to the ignorance we were in as to the tuberculous nature of their affection.

I have already hitherto maintained that the enucleation of eyes afflicted with tuberculosis should be rejected for three reasons:

1st. Because tuberculosis of the eye, which Leber looks upon as an attenuated form, is incontestably susceptible of extinction in place:

2d. Because we are in no way authorized to consider intra-ocular tuberculosis evolving in a closed cavity as primary, so long as everything seems to demonstrate that the infection started from a remote point in the organism; also, in like cases, the removal of the eye as a guarantee against infection is absolutely illusory:

3d. Because it is a question, most frequently, of young subjects, with whom the removal of an eye is a serious mutilation, while its preservation, even if it be slightly phthisical, is still a guarantee of preserving the symmetry of the skeleton of the face.

In support of the principles thus stated, Dr. de Wecker cited the example of a young child afflicted with tuberculosis of the cornea, followed by almost complete destruction of the cornea with fomation of a voluminous granulated fungus, the development of which was accompanied with very violent pains. The little patient escaped enucleation only on account of the gravity of his condition, which simulated meningitis. Nevertheless, the child was promptly restored to health and presents, at the present time, an eye slightly reduced in volume and cicatrised.

Another interesting case relates to a boy twelve years old who had been afflicted, seven years before, with tuberculosis of the iris. At that time the almost unanimous advice of the physicians consulted was that recourse must be had to enucleation. Nevertheless, a simple iridectomy performed at the point of the iris affected, althoug[illegible] might have been taken into account in the course of the operat[illegible] that the neighboring parts of the ciliary body were found to be vaded by tuberculosis, was followed by a complete cure and the ch[illegible] who has now become a vigorous lad, presents sensibly normal vis[illegible] in the eye which it was desired to sacrifice. It is useless to add h[illegible] happy the parents were that the intervention had been restricted [illegible] one purely local, although the absolute necessity of even this [illegible] cumscribed intervention might be disputed.

Dr. Terson (Toulouse.)—I presented, six years ago, the case o[illegible] young girl upon whom I had performed an iridectomy to extirpat[illegible] tuberculous nodule of the iris, of the size of a pea. Seven mon[illegible] after the operation the acuity was ½, but, the zonula having b[illegible] broken during the operation, a cataract was ultimately produ[illegible] which I was able to extract by a small incision. Recovery was nor[illegible] and there remained only a secondary membranous cataract. This patient is now nineteen years old and is in very good health. I think the interference had a good influence on the tubercular process and that if it be better to abstain in cases of miliary tubercules, we are authorized to interfere when it is a question of solitary nodules.

Dr. Parinaud.—Sixteen years ago I presented to the Surgical Society the first case of tuberculosis of the iris with assigned diagnosis. Since then observations have been multiplied and our ideas on the evolution of the tubercle and its curability have been modified. We know, in fact, that so far as local lesion goes, the tubercle tends to recovery, but there are cases in which the production of tubercles is so rapid and so extended that it is best to remove the eye.

From the point of view of curability, I will recall two observations: one relates to the son of one of our confreres; this child presented tubercles of the iris of which he was cured, and, later, signs of encephalic tubercles which got better spontaneously; the other observation is that of a young girl twenty years old, whom I treated more than fifteen years ago for tuberculosis of the iris.

Dr. Jocqs.—It cannot be affirmed that an ocular lesion cannot give place to generalization. In a case where I had proposed extirpation, which was refused by the parents, the child died three months after of tubercular meningitis.

Dr. Motais.—I have published a case of rapid general tuberculosis following tubercular ulceration of the conjunctiva.

Dr. Sulzer.—The question of enucleation in ocular tuberculosis seems to me to be decided. Tuberculosis of the iris is not the result of direct ectogenous infection and I am convinced that there is nearly always intestinal tuberculosis. These patients should then be treated like other tubercular patients.

Dr. de Wecker.—Dr. Terson's case supports my operation and I think that it is preferable to operate, when the lesions are localized, than to abstain altogether.

Bearing of Ophthalmological Geography on Trachoma.

DR. CHIBRET (Clarmonte-Ferrand).—*Conclusions:* 1st seed; microbe an unknown pathological cell.

(*a*) No micro-organism, not even the cocci, can be considered pathonomonic of trachoma;

(*b*) There is an analogy between the evolution of conjunctival granulation and that of trachoma;

(*c*) Different forms of trachoma: superficial, hard, watery granulation; soft granulation sunk in the conjunctival tissue; mixed form intermediate between the two preceding forms; folliculitis; spring catarrh, constitute the reactionary modalities of the conjunctiva in face of trachomatous infection. Folliculitis and spring catarrh may be provoked by other causes of conjunctival irritation, granulation resting alone almost constantly typical of trachoma.

2d. Soil: Race, profession, alimentation, temperament.

(*a*) The notion of race dominates the etiology of trachoma, in spite of the fact that, so far, it has been almost universally misconceived.

The immunity conferred by race is *absolute* or relative: *absolute* immunity exists in the savages of Canada: Iroquois, Hurons, MicMacs, Chippowas, Cris, Sauteux, etc., who never contract trachoma. They are very easily and gravely attacked by all other virulent diseases imported by Europeans: tuberculosis, syphilis, eruptive fevers, etc. They are absolutely refractory to trachoma in spite of the deplorable conditions in which they live, conditions which increase receptivity among the other races residing in Canada.

Certain negroes, notably those of America, enjoy a *relative* immunity with regard to trachoma (Swan Burnett). The American negroes come from the west coast of Africa, where the black race has preserved great purity. The negroes of the east coast, less pure and mixed with Semitic blood, do not seem to enjoy the same immunity as those of America (Van Millingen).

Among the white races, the Celtic race of Broca enjoys a relative immunity, that is to say, a Celt is secure from infection in the presence of trachomatous virus previously attenuated by passage through another Celt. This law is expressed by the complete absence of contagiousness of trachoma among Celtic populations: French plateau, Bavarian plateau (Chibert).

All things being equal besides, from the point of view of habitat, the three branches of the human race offer characteristic receptivities: In Cuba the three branches are represented by the negroes, the whites and the Chinese. The black race shows four times the immunity of the white race, the white twice that of the yellow; Santes Fernandez finds 16 cases of trachoma among the negroes to 67 among the white and 114 among the Chinese;

(*b*) Profession does not seem to constitute conditions of immunity to trachoma. Miners contract trachoma as well as spinners, farm laborers as well as artisans;

(*c*) Bad alimentation, above all insufficient nourishment, bad hygienic conditions, uncleanliness, are favorable conditions of receptivity to trachoma.

(*d*) Lymphatic temperament and malarial infection constitute equally a predisposition.

3d. Meteorological conditions: Atmospheric pressure; temperature; hygrometric condition; isolation.

(*a*) Climates of high altitude are unfavorable to the extension of trachoma, if to altitude be added humidity and cold, as in Switzerland. A climate of high altitude that is hot and dry, like that of Colorado, confers no immunity against presence of trachoma.

(*b*) Certain maritime climates enjoy perhaps, but in less degree, the immunity of cold and humid climates of high altitudes.

(*c*) Isolation and heat augment receptivity and diminish the effects of immunity due to high altitude or sea air.

Dr. Pechdo.—I regret that Dr. Chibret should have employed the word "Celt," which has no precise signification to our mind. He would have done better to speak to us of Auvergnate, Bretons, etc. I have good reasons for not believing in the immunity of the Celtic race. I am a Celt and I have been infected by a Celt under my care.

Dr. Galezowski.—The question of race has not the importance of that of hygiene and habitation.

DR. SULZER.—In Switzerland trachoma is exceptional. But the Swiss who have left their country are not refractory to the affection. In an abstract of Dr. Dufour, extending over four years, it may be remarked that only fifteen cases of granulation were treated. All, without exception, had been infected outside of Switzerland.

Dr. de Gouvea.—I do not believe the negro race as refractory as Dr. Chibret admits. In 1819 there were epidemics of trachoma on board the slave ships. Besides, in an epidemic of trachoma in an orphan asylum at Rive, in which were individuals of different races, the epidemic spared no one.

Dr. Abadie.—Attention must be directed especially, I think, to the seed and not the soil. In Egypt, the Bedouins escape the contagion so long as they live in their tents, but as soon as their conditions of life are changed, as soon as they settle in villages, they do not escape contamination. Another fact also show what an important rôle hygienic conditions play. For twenty-five years I have not seen two cases of granulation in my private practice, while I see them every day at my clinic.

Dr. Truc.—I agree with Dr. Abadie and believe the question of contagion takes the lead of everything.

Dr. Javal.—It seems to me the rôle played by altitude is less prominent in the report of Dr. Chibret than in his previous communications. I believe it would be important to study the particles of dust, which might be, according to the nature of the soil, more or less cutting or more or less round.

Dr. Gorecki—I do not believe in the influence of particles of dust. Cases of granulation may be observed as well in countries where no such particles are found as in those where the particles are cutting.

Dr. Chibret.—I did not say that the negro was not receptive. He is, but to a feeble degree. I will say in reply to Dr. Pechdo that the word "Celt" is applied to a well characterized anthropological type; I will also say to him that he is not a Celt, although inhabiting a Celtic country. Altitude plays a rôle, but the influence of race is predominating.

Treatment of Entropion and Granular Trichiasis of the Upper Eyelid by Tarso-Marginoplasty; Remote Results.

DRS. TRUC and VILLARD (Montpellier).—Tarso-marginoplasty, a method already twenty years old but not yet widespread, is an operation which consists in intercalating in the divided ciliary edge a shred of skin taken from the upper eyelid and remaining partly adherent to that eyelid. If the entropion is exclusively lateral, whether external or internal, the intermarginal incision and the palpebral cutaneous shred will lie without or within; if the entropion is total, the intermarginal incision will occupy the entire ciliary edge behind the eyelashes, and the palbebral cutaneous shred destined to fil up this incision will have the form of a small band left adhering by its two extremities, of a basket-handle or of a bridge. The immediate results furnished by these divers processes of tarso-marginoplasty are excellent, but is it so with the remote results? The reply to such a question had never been investigated and this is what Drs. Truc and Villard have done. These authors have seen 21 patients (furnishing 35 operations of this kind), from one to eight years after the intervention. In every case the remote results have been excellent, the cure, in a word, has been permanent, even when granular conjunctivitis had continued. The eyelashes have been definitely thrown back away from the cornea, the ciliary margin has been well reconstituted. As for the æsthetic result, it has always been very good, the eyelids presenting, for the most part a normal aspect after this operation. For all these reasons, simplicity of operative manual, evident efficiency of the method, absence of palpebral deformations, Drs. Truc and Villard consider tarso-marginoplasty as the operation to be preferred in the treatment of entropion and granular trichiasis of the upper eyelid.

Flat, Diffuse and Symmetrical Lipoma of the Eyelids.

DR. ANTONELLI (Naples).—True lipomata of the eyelid are very rare, and, in the cases reported up to the present time, the tumor has taken rise between the orbicularis muscle and the tarsus, and has been more or less pediculated. In this case the lipoma was sub-cutaneous, its lobes were enveloped by an aponeurotic sheath, and the whole had the form of a big flattened almond, larger than the tarsus. The symmetry of the affection led me to think of the analogous degenerations to which attention has been called by Potain and others apropos of lipomata in general and their symmetrical localizations, sub-clavicular pseudo-lipoma, for example. Account must be taken of this singular form of palbebral lipoma, for its differential clinical diagnosis from *elephantiasis levis seu glabra* might present some difficulties.

Traumatic Cataracts.

DR. A. PUECH (Bordeaux).—There is a general agreement to-day in the use of the expedient method with all traumatic cataracts. Immediate intervention certainly offers great dangers, at least if one pretends to operate upon a traumatic cataract in what might be called its acute period just as one would operate upon an ordinary cataract. Between extreme reserve and operative rashness there is room for different modes of intervention. Leaving aside infection and augmentation of pressure, a great part of the complications that arise in an eye which has undergone a traumatic cataract, must be attributed to a cause which has been left far too much in the shade, if it is not entirely unknown; this cause is the irritating chemical action which may be exercised on the tissues of the eye by lens fibres dissolved in the aqueous humor.

If aspiration gives such fine results as an operative mode for traumatic cataract, it owes it to its effect of ridding the eye of the most irritating agent which traumatism could create, outside of infection and the shock itself. The rôle of the lens fibres will be demonstrated the day when numerous observations of traumatic cataract, without opening of the eyeball, shall bring out grave symptoms of iridochoroiditis cured almost instantaneously by the mere issue of these masses.

The author reports four of these observations.

Aspiration remains, then, the method of preference for operators familiar with this operation, but all oculists may replace it by simple paracentesis, performed, not from above downward, but at one of the two extremities of the horizontal diameter of the pupillary field. The selection of this place for paracentitis has the advantage of allowing the anterior chamber to be filled anew and very quickly, as soon as there is no longer any pressure on the posterior lip of the wound.

To sum up, the irritating action of the lens fibres contained in the anterior chamber appearing to be well established by clinical facts, it is best to evacuate these fibres as a means either preventative or curative of certain inflammatory phenomena capable of compromising the vitality of an eye affected with traumatic cataract.

Gumma of the Ciliary Body.

DR. A. TERSON (Paris).—Gummas of the ciliary body have been already observed by some authors, and considered as tardy lesions occurring many years after chancre. The author has already reported (*Arch. gén. de méd.*, 1894) an observation where ciliary gumma occurred in the first year of syphilis.

Gumma of the ciliary body is a very serious accident, which must not be confounded with condyloma of the iris, so easily curable. Gummas of the ciliary body rapidly perforate the sclerotic, and often bring on atrophy of the eye.

Dr. Terson reports two new observations: in one the eye was preserved by an energetic treatment with intramuscular injections; in the second the eye was atrophied. Accidents of *premature tertiarism* (Fournier) have occurred, in the first two years of syphilis, accompanied with gummas and periostitis in young, alcoholic and ailing subjects. It is a question of syphilis evolving in a much graver fashion, on account of the nature of the soil.

From the therapeutic point of view, intramuscular mercurial injections are much more efficacious than inunctions, and, as in grave lesions, have given the best results.

All the tertiary syphilitic accidents of the eye and its adnexæ may equally occur, and often do occur in the first years of syphilis, long before the tardy period which is assigned to them in literature.

Keratitis Recurring Through Infectious Dacryo-adenitis.

DR. SAUVINEAU (Paris).—The relations of certain grave affections of the cornea (ulcers, abscesses), with affections of the lachrymal sac and the nasal canal, in a word, of the *lower* lachrymal passage or excretory passage are well known. On the other hand, nobody has ever called attention to the connection of these same cases of infectious keratitis with the *upper* lachrymal passages, that is to say, with the lachrymal gland.

The author reports the case of a girl, seven years old, in good health, absolutely free from every general affection, without hereditary or personal antecedents, who, since the age of three, has had frequent attacks of keratitis of the left eye, manifestly of an infectious nature: ulcers and abscesses of the cornea, sometimes accompanied by hypopyon. This child had been treated for four years, without success, by many well-known oculists. Every acute attack had been cured, sometimes necessitating the application of the cautery; but, after a short period of repose, the disturbances of the cornea would reappear.

Thinking to find the cause of this infectious keratitis, always localized in the left eye, in the infection of the accessory lachrymal gland of the same side, which was very large, mammillated and purple, and the secretion of which, cultivated in gelatine, revealed the presence of staphylococci in pure culture, the author used injections of sublimate ($\frac{1}{1000}$), directly into the parenchyma of that gland. The keratitis was cured very rapidly. Three months afterward the child, having gone to the seashore, was taken with another violent attack of suppurative keratitis. A few injections of sublimate in the lachrymal gland, given again, quickly disposed of this relapse.

Since that time, that is to say, for three years, she has remained cured. The gland is atrophied, and presents a cicatricial aspect.

The author concludes that in circumstances less rare, without doubt, than is generally thought, the accessory lachrymal gland may be infected as the lachrymal sac is infected; and that, besides, ulcers and abcsesses of the cornea may occur consecutively to infectious *dacryo-adenitis*, as they follow *dacryocystitis* or blennorrhea of the sac.

It is then suggested, in cases where the origin of the infection of the cornea escapes us, to examine with care the condition of the accessory lachrymal gland.

Some Results of Clinical Ophthalmometry.

DR. SULZER.—(Will be published in full).

On the Treatment of the Detachment of the Retina.

DR. H. DOR (Lyons).—This treatment consists in applications of the Heurteloup leech, cauterization of the sclerotic, sometimes also in sub-conjunctival or intra-tenonian injections of concentrated common salt (25 to 30 per cent.); finally in an absolute dorsal decubitus. In 15 cases thus treated during 2 years, the retina was re-attached 10 times; 9 times permanently; once there was a relapse at the end of 7 months. There were 5 failures, but of these cases 2 failures arose from lack of perseverence on the part of the patient. In the cases cured, the visual field is normal for white, but as soon as it darkens, a relative scotoma appears, and, besides, the vision of colors is always diminished or abolished in the extent of the old detachment.

Dr. de Wecker.—Last year Dr. Terson made a communication to us on the treatment of detachment by electrolysis. Since then I have tried this process frequently, but I have not obtained very good results; on the contrary, I continue to use cauterizations. I am happy to learn the good results of Dr. Der. I have tried heretofore injections of salt water (3 per cent.); I never established painful phenomena, but I have abandoned the injections as being inefficacious.

Dr. Vacher.—I am accustomed to withdraw the sub-retinal liquid by puncture with a Pravaz's syringe, and I follow up these punctures with applications of the cautery. In one case I obtained a cure which has now lasted a year: in another case there was a relapse after three months.

Dr. Terson.—The use of electrolysis does not prevent the application of other means. It is not necessary to employ a grooved needle. I prefer to use a fine needle, and not to exceed a current of 5 milliamperes. I believe electrolysis to be superior to simple puncture. I follow it with as long a dorsal decubitus as possible

The patient operated upon and whose case I have published, remains, as a matter of fact, still cured. I have had a certain number of failures this year, but I will call your attention to a young patient who was brought to me in a state of complete blindness and who had 23 D of myopia. Sight has been restored and the patient can read No. 1 of de Wecker's scales.

Dr. Chibret.—I have injected the vitreous of a rabbit with a syringe which allowed its direct exhaustion, and its injection quite warm, without manipulation or contact of the air. I experimented first on the rabbit, by exhausting 1 gram of the vitreous from one eye and injecting it into the vitreous of the other eye, after having made place for it by a puncture of the anterior chamber. There was no difference, during two months, between the vitreous of the two eyes; a spot of analogous appearance in both eyes, alone indicated the addition and subtraction of the vitreous.

I tried this on the human eye in a very bad case, with hypotony, and injected into it ½ gramme of vitreous drawn from the eye of a rabbit from which I had already drawn once before.

I had almost no reaction, only a little passing tension, and I regretted not having injected a greater quantity. I was thinking of a new injection when a letter from Deutschmann informed me that he no longer counselled the operation in a case of hypotony.

Dr. Martin.—In comparison with results obtained by surgical treatment, it is useless to report facts where the results have been obtained by a treatment purely medical. I have observed a case where with rest and the Heurteloup leech I have had a perfect result.

Dr. Parinaud.—When different means are employed simultaneously, it is difficult to discover which acts. I believe the most useful thing is puncture and repose, and I have recently communicated to the Paris Ophthalmological Society convincing observations in this respect.

Dr. Dor.—I believe the combination of the cautery and injections of salt solution gives results superior to those of other processes.

Dr. Rottemand.—I used injections of salt water long before Dr. de Wecker, but the solution I used was 20 or 30 per cent.

Objective Aberoscopy by Means of Skiascopy.

DR. ANTONELLI.—The aberoscopy of the human eye has much theoretic interest and may have practical applications. It is important, then, to possess a simple method for objectively studying the aplanetism of the eye, and this method is furnished by *skiascopy with linear tuminous source.* If the eye to be examined is slightly myopic (1 5 to 2 D), or rendered so by a proper glass, and if the observer is placed at a distance of about 75 centimetres with a concave mirror, the field of illumination will be represented by a more or less distinct line, the deformations of which will indicate very well the kind and degree of monochromatic aberrations of the eye. Indeed, by the rotation of our mirror, the retinal image of the luminous line will be formed across more and more peripheral zones of the dioptric media of the eye; then, this image, that is to say, the skiascopic field of illumination, will be brought forward into the field of examination, becoming curved in the same manner as the pupillary edge, if the aberration conforms to the rule, or curved inversely, if the aberration is overcorrected or negative.

Here are some results of these researches: 1st, positive aberration is, in general, stronger in the myopic than in the hypermetropic, with approximate equality between the degree of ametropia and the pupillary diameter; 2d, the emmetropic or hypermetropic eye very often reveals aplanetism for a pupillary diameter of 5 or 6 millimetres, and it is not rare to meet, in such eyes, even during a maximum mydriasis, a perfect enough aplanetism or a certain degree of inverse aberration; 3d, in the normal eye the accommodative effort corrects, sometimes even overcorrects, the spherical aberration, without the influence of the synergic contraction of the pupil. In an eye with pupil dilated and power of accommodatian uninjured, the modification of the phenomena of aberoscopy during the accommodative effort shows rather that the peripheral zone of the dioptric field does not increase in refraction as much as in the central zone.

Operative Treatment of Astigmatism.

DR. PFLUEGER.—The curvature of the cornea may be changed by different methods : 1st, by losses of substance at its periphery, without perforation of the cornea, by means of the galvanocautery, or of a small special curette ; 2d, by incisions of the cornea.

The first method produces a flattening of the cornea, perpendicularly to the direction of the loss of substance, like the cicatrices following superficial ulcerations.

The second method does not always, as we have until now believed, according to the experience given by extraction of cataract, produce a flattening of the cornea in the meridian of insertion, and an augmentation of the curvature in the direction perpendicular to it.

A list of operations for myopia of high degree demonstrates this new fact, that the cornea often augments its refraction in the two principal meridians.

The correction of myopic astigmatism seems, up to the present, the only one possible; but hypermetropic astigmatism also, which has remained until now a pure desideratum, seems to enter an attackable ground.

The effect of the decision varies according to its extent, its distance from the limbus and its obliquity.

Spectacles with Superposed Glasses for the Myopic and the Hypermetropic.

DR. A. BOURGEOIS (Rheims).—These spectacles are on an analogous model to those presented two years ago by the author, for persons who had undergone an operation for cataract. In this new model, the ellipses are smaller and essential point, the movable part may be raised with one hand alone, the other hand remaining free to continue work without interruption.

In spectacles with superposed glasses, the best arrangement consists in articulating the movable glass to the upper part of the fixed glass, so that the former may be raised on the forehead ; it results that the glasses for vision close by should always be placed in the fixed part. These spectacles serve especially for study and for work. Ordinarily, the person may wear simple glasses.

Sub-conjunctival Cyst.

DR. CHEVALLEREAU had removed from a girl, three years old, a sub-conjunctival cystic tumor, situated in the internal angle of the left eye, hard, about the size of a cherry-stone, without any adherence to the adjoining parts; he did not give the histological examination, and thinks it was a congenital tumor.

Glaucomatous Sympathy; Influence of Enucleation and Optico-ciliary Neurotomy of an Eye with Glaucoma, on the Other Eye with Irritative Glaucoma.

DR. TRUC.—In several cases I have noted a slight improvement of vision in a glaucomatous eye after enucleation or optico-ciliary neurotomy, performed on the opposite eye which was attacked previously with absolute glaucoma. We must admit a glaucomatous sympathy in some sort comparable to sympathetic ophthalmia, and it is useful to enucleate eyes afflicted with painful absolute glaucoma.

Dr. de Wecker.—We know, on the contrary, that the glaucomatous state of the eye lost is a guarantee against sympathetic invasion of the opposite eye, and I believe it dangerous to admit this notion of sympathetic glaucoma.

Dr. Darier.—I have seen sub-acute glaucoma occur in an eye after hernia of the iris following a contraction of the crystalline in the opposite eye. This glaucomatous condition yielded, four days after the outset, to the resection of the prolapsed iris.

Dr. Abadie —The existence of sympathetic glaucoma seems to me to be demonstrated by the observations of it which I have published.

Dr. Coppez.—I do not believe there exists a glaucomatous sympathy analogous to sympathetic opthalmia, but what is often observed in the action exercised by the painful state of one eye on the development of a glaucomatous attack. But, in this case, the ocular pains do not act otherwise than any nervous shock, and there is no sympathetic transmission.

Dr. Sulzer.—I am of Dr. Coppez' opinion, and it will suffice if we understand what we mean when we speak of glaucomatous sympathy.

Dr. Truc.—Twice out of four cases there existed no ocular pains; the element of pain, then, has no interest. I will add that in the three cases in which I performed optico-ciliary neurotomy, the operation was followed by no inconveniences.

Study on Images of Diffusion.

DR. BULL had observed that, in order to thoroughly comprehend what an error of refraction is, the circles of diffusion must be well studied. Bv means of photography, constructions and calculations, he showed the relation existing between the disturbance of printed characters seen by patients and the size of their pupils and the degree of their myopia or hypermetropia. He explained how the circles of diffusion distort the letters of the test tables; he announced in consequence the following rule:

The diameter of the circles of diffusion is directly proportional to the diameter of the pupil and to the degree of the error of refraction.

The size of the circles of diffusion for an error of 1 D, with a pupil of 4 millimetres being, in general, 0 millim. 06, we may determine, by means of this rule, the form and the degree of ocular disturbance to be observed in any patient whatsoever.

Dr. Bull showed also how the circles of diffusion are modified, in every eye, by a slight degree of monocular polyopia due to the irregularity of the sectors of the lens.

Pseudo-glioma of the Retina.

Dr. LAGRANGE (Bordeaux).—Metastatic ophthalmia consecutive to general affections has been considered by many authors as constantly due to bacterial embolism, to the direct action of pathogenic microbes on the media of the eye. Roth had nevertheless rightly distinguished from malignant metastatic ophthalmia, in its grave form, a milder variety, to which he gave the name of chronic septic retinitis. This affection would be the result of the action of toxine due to a general poisoning, carried into the eye through the circulation.

Under the influence of the labors of Littas and Kahler, the doctrine of Roth had lost much ground, when Herrnheiser (of Prague) happened to show the presence of veritable ophthalmia consecutive to a general affection, without its being possible to find in the eye any microbic agent.

Dr. Lagrange reports a case of this kind. It was a lesion occurring in a child two years old during a grave general affection. This ophthalmia was accompanied by a very abundant exudation, filling almost the entire vitreous and presenting the symptoms of retinal glioma. Histological examination showed that it was a question essentially of mucous degeneration of the ganglion cells of the retina, of the endothelium of the choroidal vessels and of the connective tissue of that membrane. Besides, an abundant sero-albuminous exudation had not only invaded the vitreous, but detached the retina from the choroid and filled the interstices of the supra choroidal space.

Bacteriological examination, performed with great care, showed that no microbe existed in the enucleated eye.

Dr. Kalt.—I have observed cases analogous to this of Dr Lagrange's in children, after grippe or pneumonia. The eye was a little painful. and the symptoms once calmed, there was found, together with hypotomy, a whitish tint of the fundus oculi, due to a retinal detachment and looking something like a glioma; the term "pseudo-glioma" nevertheless seems to me a bad one.

From the fact that no microbes were found in the sections, it cannot be concluded that there were none; besides, Dr. Lagrange made no cultures.

As for the absence of embolisms, that has no significance, for they are sometimes so limited that they may be passed over.

Dr. Louis Dor.—Dr. Lagrange's case seems to me very interesting. I have observed an analogous one in the case of a patient who had some slight infectious accidents and who presented himself a month afterwards with a retinal detachment which, it was believed, should have been attributed to the presence of a malignant tumor. Enucleation having been performed, lesions were found identical with those described by Dr. Lagrange, and among others a hyaline degeneration of the choroid. The search for microbes was negative.

Dr. Despagnet.—I have observed two similar cases, one in a patient who had metastatic choroiditis with humeral arthritis. The enucleated eye contained the staphylococcus. The other case is especially interesting because suppurative choroiditis had not ended with purulent disintegration of the eyeball. The process was arrested and a little hypotomy persisted, but the eye preserved a sensibly normal appearance.

Dr. Morax.—Dr. Lagrange admits that, in the case the histological examination of which he has communicated to us, it is a question of an active process in course of evolution. I see nothing in the observation which can be pleaded in favor of that interpretation, and it seeems to me more plausible to admit that it is a question of inflammatory lesion in course of retrogression. The absence of micro-organisms may thus be explained. Do we not know clinically and experimentally that after a variable length of time, sometimes very short, certain micro-organisms may disappear from the lesion they have provoked? I must wait also, before admitting the toxic origin of a case of chorio-retinitis, until Dr. Lagrange gives us more convincing proofs.

Dr. Dianoux.—I have observed several cases which came under the description which Drs. Lagrange, Despagnet and Terson have just given, clinically speaking. They have as special characters painlessness and preservation of the integrity of the pupil.

These cases seem to me very important from the point of view of general pathology. They are lesions due to the elimination of toxines after general infection, probably of a microbial nature.

As a rule, these lesions recover spontaneously; I have even seen, in a young girl, a complete cure with restitution of sight to the right eye, while in the left exudation became organized in the fibrous state with preservation of the tonus.

Hydatid Cyst of the Orbit.

DR. FAGE (Amiens).—Hydatid cysts of the orbit are interesting for their rarity, the errors of diagnosis which they cause and the disorders they sometimes produce in the eye.

The one I observed was situated in the supero-internal portion of the left orbit of a child six years old. It had about the volume of an almond, lifted the upper eyelid and protruded into the fundus of the conjunctival cul de-sac; there was neither exophthalmus nor compression of the optic nerve. An exploratory puncture allowed the withdrawal of an alkaline liquid, rich in chlorides and clear as spring water: I could find no hooks in it.

An injection of sublimate in the cystic pocket not having effected a cure, this pocket ultimately was excised and the cure this time was permanent. The anatomo-pathological examination revealed to us that it was a case of an unique hydatid contained within a wall formed by a homogeneous substance disposed in superposed folia, with no appearance of germinative membrane.

Exploratory puncture is the surest means of establishing the diagnosis: by following it with an injection (sublimate of iodine) capable of killing the hydatids, a cure is usually obtained. But the process of preference is extirpation of the cystic wall. If the whole pocket cannot be removed, what remains must be subjected to scraping and irrigation with sublimate.

Dr. Abadie.—In an analagous case I gave an injection of sublimate (1 1000). For one month the volume of the cyst did not diminish; then little by little the tumor disappeared.

Dr. Terson (Toulouse).—I treated a voluminous cyst of the orbit by puncture without injection. A relapse occurred after two years. I then made a large opening which gave issue to a great number of hydatids. Excision of the pocket brought about a final cure.

Dr. Maréchal (Brest).—I have also seen a case in which the injection of sublimate gave no result.

Pathogenesis and Treatment of Non-Cicatricial Ectropion.

DR. JOCQS (Paris).—Non-cicatricial ectropion occurs especially in old men who have lachrymation of the eyes, and is accompanied by relaxation of the orbicularis. Cauterization, in the form of deep vertical burning, combined or not with Snellen's sutures, gives very good results.

Dr. Kalt.—To cauterization which is long in healing I prefer excision of a triangular segment of the tarsus, with superior base, with suture of the edges of the wound. The relief is immediate, and cure is obtained in four days.

Dr. Parinaud.—The inconvenience of cauterizations is that their effects are produced slowly, sometimes only at the end of a month.

Dr. A. Darier. —In like cases I have abandoned thermocautery and only perform excisions of the tarsus with the knife.

On Divers Varieties of Chronic Glaucoma and Their Treatment, by Dr. Abadie.

(See ANNALES D'OCULISTIQUE, Vol. CXIV, p. 397.)

On Preventive Enucleation Before Operation on the Sound Eye.

DR. PECHDO (Villefranche) reported two observations on operation for cataract, in which failure appeared to be due to the sympathetic action of the non-operated eye, previously lost, a sympathetic action which broke out under the influence of the cataract operation.

He thought that an eye already lost was a complication for the other eye when afflicted with cataract and that it should be carefully examined and the operation for cataract preceded, in certain cases, by preventative enucleation of the lost eye.

On Tuberculosis of the Conjunctiva.

DR. MITVALSKI (Prague).—I have observed six cases of conjunctival tuberculosis. This affection presents itself either in the form of polyps of the tarsus or in the ulcerous form. In one case I have seen on infiltration of the mucous membrane by yellowish nodules produced ; infection took place by propagation from tuberculosis of the ciliary body. Tubercular metastases in the conjunctiva are the exception ; habitually, it is a question of direct inoculation, coming from without. Baccilli are very rare in these lesions.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Session of May 7, 1896.

Cure of Sympathetic Ophthalmia.

MR. ANDERSON CRITCHETT.—I call your attention to the case of a man fifty-five years old, who, on the 30th of last January, received a fragment of iron in the right eye. This foreign body produced a penetrating wound of the cornea, but no fragments remained in the eye. Two days after, the lens was opaque and tumefied, and there was secondary glaucoma. The lens was then extracted. The operation was accompanied by a slight escape of the vitreous. Up to February 20, everything had gone well, when at that date the eye became painful and inflamed. The sight was lost, and enucleation was performed five weeks after the accident, and two weeks after the beginning of the painful phenomena.

On March 22, he was brought to the hospital completely blind; the left eye was injected and the affection of that eye had begun twelve days after enucleation of the right eye. The pupil was immovable and contracted; the tension was augmented under the influence of atropine, the synechiæ partly broken. Daily hydrargyric frictions were prescribed On April 15 vision was $\frac{5}{36}$. The patient affirmed that he had never had syphilis, and he showed no signs of it. At present the vision is $\frac{5}{6}$, and the fundus oculi is normal in appearance.

I should remark that the wound of the left eye was superficial, and that the uveal tractus was not reached; besides, the enucleation of the eyeball did not prevent the apparition of sympathetic phenomena, and the return of sight shows that the affection may be cured.

I have seen a woman forty-two years old who was brought to me last September with complete blindness. She related that twenty-three years before she had received a traumatism of the left eye, that iridectomy had been performed on that eye, and that since then the sight had grown progressively weaker. In October she had received a blow upon that eye which had caused a vivid pain and had destroyed its sight. A few days after the accident the right eye became inflamed, but the sight remained the same, till all at once it declined; I performed iridectomy.

Last summer the sight grew worse and she could only count fingers with difficulty. I extracted the cataract from the left eye, and the sight of that eye with - 11 D rose to $\frac{5}{60}$.

Mr. Nettleship.—These cases constitute facts of cure of sympathetic ophthalmia; the patient having presented attacks of iritis a little after the injury of the first eye. The question which arises is to know if the removal of the traumatized eye has any influence on the degree and duration of sympathetic ophthalmia. I should like to know if our associates have observed cases of cure without enucleation of the eye primarily attacked.

Affection of the Optic Nerve in a Mother and Her Three Children.

MR. R. D. BATTEN.—The mother lost her sight at the age of twelve. The affection rapidly attained its acme and since then the sight has remained stationary. A sister, thirty-three years old, has weak sight, the beginning of which dates from the end of her childhood.

A brother, fifty-one years old, had a rapid weakening of vision at the age of eleven, which has persisted since.

Of the three children of the first patient, the eldest, a boy of twelve, presents a certain degree of optic neuritis; the elder daughter, ten years old, has papillary atrophy; and the younger daughter, eight years old, has beginning of optic neuritis. There are no hereditary blemishes, nervous or other.

In the case of the mother, the sight is $\frac{1}{60}$ OD and $\frac{2}{60}$ OS, with no amelioration from glasses. The papillæ are pale and atrophied, the contours badly defined.

Mr. Habershon.—The interest of these cases resides in the epoch of apparition of the visual disturbances. Most of the cases of Leber's disease begin between the ages of fourteen and sixteen, and, with women, puberty and the change of life are the periods at which the affection most frequently manifests itself.

Case of Optic Pseudo-Neuritis.

MR. HOLMES SPICER.—I present to you the case of a child nine years old, whom I saw for the first time in April, 1893; he complained at that time of pains in the eye accompanied by winking; these disturbances persisted for six weeks. Emmetropia. V = $\frac{6}{6}$. The two papillæ were pale and tumefied; their contours diffused. In November, 1893, V = $\frac{6}{6}$. Since then, he has had some attacks of colored vision. There is no contraction of the visual field, and in the three years, during which he has been observed, there has been no modification of the papilla, which gives the appearance of optic neuritis at its outset.

Mr. Hartridge.—This case should be described as persistent optic neuritis and not as pseudo-neuritis. We have all seen cases in which the lesions have persisted a long while without weakening the sight.

Mr. Batten.—The ophthalmoscopic aspect gives the impression that the retina had been pushed through too narrow a hole. This case resembles the facts of hypermetropia, but lacks the aspect of fine striation.

Mr. Marcus Gunn.—If any of you meet a case of this kind, let him follow it up. I once observed a similar case and followed it for four or five years, when I lost sight of it. During that time the sight remained normal. There was hypermetropia of 4 to 5 D. Wearing correcting glasses had no influence on the aspect of the papilla. I remember a patient at Moorfields whose case belongs perhaps in the same category.

Mr. Quarry Silcock.—In this particular case there have never been either inflammatory exudation or hemorrhages. I remember the case of a young woman which was presented to my observation two years ago. She suffered with headaches, vomiting and other diffused symptoms, and trepanning had been proposed to her, it being supposed she had a cerebral tumor. In the end, nevertheless, we came to the conclusion that it was a question of functional disturbance. It is evident that these cases present great difficulties of diagnosis.

Mr. Adams Frost.—I remember several cases in which optic neuritis has persisted a long while, as in the case in question. From the fact that the papilla presented no modifications, it does not follow that it is not a case of veritable neuritis.

Mr. Holmes Spicer.—I spoke of pseudo-neuritis, because it seemed to me that this was a question of physiological conditions. Optic neuritis as marked and of as long duration would have produced a weakening of vision, while in all the examinations I have made, the acuity has always been normal.

Lymphangiectasis of the Eyelids.

MR. D. MOWAT.—The boy in question presents a peculiar swelling of the lower eyelid of the right eye. If the lower lid be pressed, the liquid passes under the upper eyelid. If the hand be applied to both eyelids at once, the liquid is displaced toward the right side of the face, and goes to produce a tumefaction behind the ear, and *vice versa*. The eyelid has been affected for three years, and the retro-auricular tumefaction dates from eighteen months ago. The tumefaction of the eyelid has increased to such a point that the eyeball is completely hidden by the eyelid.

Unilateral Paralysis of the Sixth Nerve; Retraction of the Eyeball and Contraction of the Orbicularis in Rotation Inward.

MR. MACLEHOSE.—This is a case belonging to that interesting group of facts which show the existence of associated movements. The essential symptoms are as follows: Paralysis of the sixth pair exists on one side, or rather the impossibility of abduction of the eyeball. On the same side the palpebral slit is narrower when the eye is directed inward, and there is a defect of retraction of the eyelids. One can even see an empty space produced between the surface of the eyeball and the lower eyelid.

In one of my cases there was a certain degree of permanent exophthalmus. In some published cases paresis of the internal rectus seems to exist.

Hemorrhage of the Orbit.

MR. MARCUS GUNN.—A woman, sixty-seven years old, has just consulted me for an œdematous tumefaction of the eyelids, with exophthalmus of the right eye. The movements of the eye are limited in all directions. The pupil is dilated and insensible to light. The tension is normal; eight weeks before she had suddenly had tumefaction of the right eye on the right side of the face. The eyelids were closed, and could not be opened voluntarily. The physician consulted thought that a hemorrhage existed. The papilla was atrophied and by pressing lightly on the globe a slight pulsation of the vessels was remarked. There is no paralysis of the fifth pair, but the third is affected; the fourth and sixth are slightly affected. I thought first of thrombosis, but the history of the hemorrhage and the pulsation made me think that these symptoms were due to the rupture of an aneurism of the ophthalmic artery. It is possible also that a malignant tumor was the origin of the hemorrhage.

Mr. Nettleship.—The blood discharged in the orbit might limit the muscular movements; but what does the author think of the action exercised by the discharged blood about the optic nerve?

Mr. Eve.—I remember a young girl who came to see me with exophthalmus and immobility of the eyeball, which had existed a long time. The optic nerve was atrophied. In removing the eye, I found sarcoma of the fundus of the orbit, presenting a cavity full of blood. If the wall of this cavity had not yielded, the result would have been apparently the same as in the case of Mr. Gunn.

Mr. Marcus Gunn.—It is possible for the optic nerve to be enveloped by hemorrhagic discharge; but I do not believe that the pressure of blood can provoke atrophy of the nerve.

Detachment of the Retina Treated by Drainage.

MR. F. EVE.—I have had under treatment a patient whose sight was affected for the first time, in December, 1895. I saw him in January. He then had opacities of the vitreous, an index of anterior choroiditis. In February he suddenly lost the sight of the left eye. There was an extended detachment of the retina, taking in its lower half. He was given iodide of potassium, kept in bed for fifteen days, and every day injections of pilocarpine were given. This treatment was without effect. March 3, I made a scleral incision and introduced a canula to evacuate the liquid. Through the canula I introduced a little bundle of horse-hairs. Three days after I removed the drain because of the conjunctival reaction it had produced. Some days after, the visual field was normal, but opacities of the vitreous still existed. April 20, $V = \frac{6}{23}$, but a week later there was a slight decline ($V = \frac{5}{36}$), following an increase of the opacities. At present the visual field is normal; I have found no further traces of detachment, but in the region of the papilla, and in front of the retina there is a grayish exudation corresponding perhaps to connective tissue in formation. It is to be regretted that opacities of the vitreous should obscure the sight, but these opacities existed before the treatment.

ACADEMY OF MEDICINE.

Session of April 7.

On Ocular Manifestations of Leprosy.

DR. DE GOUVÊA read on this subject a paper in which he stated that these manifestations are, in general, much tardier and rarer in the nervous and anæsthetic form than in tegumentary or cutaneous forms.

Leprous affections of the eyeball are generally consecutive to palpebral lesions: they only occur tardily when, in consequence of the insufficiency of the orbicular muscles, repeated congestive and inflammatory pressures have at length prepared the ground for their evolution.

It results from these considerations that the only really efficacious treatment against ocular manifestations of leprosy consists in combatting the leprous lesion of the palpebral conjunctiva and in the early correction of the insufficiency of the orbicular muscles by prophylactic blepharorrhaphy, as extended as possible, followed by the application of an ocular bandage during sleep for the period of complete atrophy of the orbicular muscles.

MEDICAL AND SURGICAL SOCIETY OF BORDEAUX.

March April, 1896.

Bitemporal Hemianopsia; Double Papillary Atrophy Tuberculosis of the Base.

DR. ARMAIGNAC referred the case, presented in December, 1895, of a patient with bitemporal hemianopsia (See ANNALES D'OCULISTIQUE, February, 1896), who on January 12th had recovered his normal visual field on both sides.

At the end of January this patient experienced again for some days a violent cephalalgia with constrictive pain about the thorax; consecutive amelioration during three weeks.

February 21st, access of cephalalgia with uncontrollable vomiting during two days; at the same time, in the left arm and leg, tinglings very much complained of, then paresis, finally complete hemiplegia of the left side. A little after, tingling and paresis of the right side. The bladder and the rectum have since then been paralyzed for several days; every two or three days, vomiting and cephalalgia; urine normal; pulse oscillating between 90 and 110.

The patient continues to take strong doses of iodide of potassium and hydrargyric frictions.

March 14th, complete flaccid hemiplegia on the left side, paresis of movements and sensibility on the right side. Pulse, 90. The eyes are haggard; the pupils, very much dilated, react slightly to light; vision has declined considerably, cephalalgia has disappeared. With the ophthalmoscope, complete atrophy, white in appearance, of the two papillæ.

The appetite is preserved; no paralysis of the cranial nerves. The intelligence remains heavy, the patient's character is simply irritable.

This second part of the observation complicates the first and renders the diagnosis still more difficult.

Dr. Villar proposed exploratory craniectomy, if there were good reasons for believing the lesion was seated in the convexity.

Dr. Pousson localized the lesion in the base and was not a partisan of craniectomy.

Dr. Davezac believed equally in a lesion of the base, tuberculoma in the vicinity of the chiasma, with probably other analogous tumors in adjacent regions, and the protuberance; the absence of convulsions eliminated the idea of meningeal or cortical lesions to which the cephalalgia might seem to point.

Dr. Larroussinie.—Tuberculosis of the motor regions does not induce forcibly convulsions, for example in the anterior part of their internal capsule.

April 10th, Drs. Armaignac, Villar and Pitres examined the patient again; there had been a very decided improvement. The right paresis had disappeared, the left hemiplegia had diminished, the articulations of the knee and the elbow were able to make some movements of flexion. Sight was partly restored.

Dr. Pitres concludes in the existence of a tuberculous mass lying in the region of the base. Surgical intervention is, then, no longer to be thought of.

V.—MISCELLANY.

ITEMS.

Copenhagen Faculty of Medicine.—Dr. Bjerrum has been named regular professor of ophthalmology, in place of Dr. Hansen Grut, resigned.

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